



Government of Bengal
Department of Agriculture

Annual Report of the
Department of Agriculture
Bengal

For the Year
1939-40

Part II

Superintendent, Government Printing
Bengal Government Press, Alipore, Bengal
1941

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Annual Report of the Department of Agriculture, Bengal, for the year 1939-40.

PART II.

Annual Report of the Economic Botanist, Bengal, for 1939-40.

I.—Administration.

I held the charge of the section throughout the year. Babu Kali Prasanna Roy, Senior Botanical Assistant, went on deputation as Special Agricultural Officer in the Irrigation Department on the 15th February 1940. Babu Bhupendra Nath Ghose, M.Sc., was appointed to officiate in the vacancy and joined on 1st April 1940.

The following new staff for the section was sanctioned and appointed during the year:—

One Botanical Assistant in the Subordinate Agricultural Service, Class I.

One Additional Entomological Assistant in the Subordinate Agricultural Service, Class I.

One Additional Mycological Assistant in the Subordinate Agricultural Service, Class I.

Maulvi Fariduddin Ahmed, M.Sc. M.A., B.T., who was serving as a Botanical Assistant in a temporary capacity so long was appointed substantively in the new post of Botanical Assistant and joined on 9th January 1940. Maulvi Mazharuddin Qureshi, B.Ag., and Babu Jagadish Chandra Saha, M.Sc., were appointed as Additional Entomological and Mycological Assistants, respectively, and joined on 9th and 18th January 1940, respectively.

Babu Subrata Sen, M.Sc., ASSOC. I.I.A.R., was appointed in the temporary post of Botanical Assistant vacated by Maulvi Fariduddin Ahmed, and joined on the 28th March 1940.

Babu Profulla Chandra Sen, Entomological Assistant, went on 3 months' leave preparatory to retirement from 21st June 1939. The post vacated by Babu Profulla Chandra Sen was filled up by the appointment of Maulvi Abdul Hakim Bhuiya, M.Sc., who was subsequently appointed substantively to the post after the retirement of Babu Profulla Chandra Sen.

The staff of the Rice Research Stations, Bankura and Chinsurah, remained as in the last year.

There was no change in the staff of the Horticultural Station, Krishnagar, during the year under report.

In the Scheme of the Regional Survey of Sugarcane-Borers, Maulvi Abdul Hakim Bhuiya, Entomological Assistant, Dacca Region,

was appointed to officiate in the vacancy created by Babu Profulla Chandra Sen, Entomological Assistant of the Department, from 21st June 1939. Maulvi Abdul Hakim Bhuiya was subsequently appointed Entomological Assistant of the Department on the retirement of Babu Profulla Chandra Sen from 21st September 1939.

Maulvi Mazharuddin Qureshi, Entomological Assistant, Berhampore Region, was transferred to Dacca Region and held the charge of the Berhampore Region till the appointment of Babu Anath Bandhu Mitra, B.A.G., as Entomological Assistant, Berhampore Region.

Leave.—None in the staff went on leave.

Tours.—I spent 107 days on tour throughout the year in connection with the experiments conducted by this section in the District Farms and also at the Rice and Horticultural Stations. Study of local problems on paddy was also made during the tour. The meetings of the Advisory Board, Imperial Council of Agricultural Research, India, held in June and November-December at Simla and New Delhi, respectively, were attended by me. On the latter occasion I attended the Advisory Board and also the Agricultural Board meetings representing the Director of Agriculture, Bengal.

The staff spent 243 days on tour in connection with rice, wheat, pulse and fruit experiments conducted at different places.

Receipts.—Total receipts from the sale-proceeds of the section including the Rice and Horticultural Stations during the year 1939-40 was Rs. 3,370-13-6.

Research Schemes financed by the Imperial Council of Agricultural Research.—The Rice Research Scheme, Bengal, carried at Chinsurah and Bankura was extended for a further period of two years 1940-41 and 1941-42. The Horticultural Scheme, Krishnagar, was extended for a period of one year only 1940-41 on conditions that 50 per cent. of the cost would be borne by the local Government.

New work.—Besides what is being done (reported elsewhere) of the research on deep-water paddy, a scheme has been submitted to the Director of Agriculture, Bengal, for undertaking work on the crop including boro paddy on a permanent basis as is being done with other classes of paddies by this section.

Berhampore Centre of the Scheme of Regional Survey of Sugarcane-Borers was abolished on 29th February 1940. Babu Anath Bandhu Mitra, Entomological Assistant, Berhampore Centre, was reappointed as Entomological Assistant, Dacca Centre, and joined on 1st March 1940.

II.—Investigations.

Research on the improvement of paddies of Bengal was the main work of the section. In addition to this, research on the improvement of wheat, pulse and fruit culture was also carried on. With the appointment of Additional Entomological and Mycological Assistants, research on diseases and pests of the crop plants and their control has been undertaken.

Paddies.—There are five classes of paddy in Bengal; of these, research on three classes of paddy was carried out at the following experimental stations:—

- (1) Dacca Farm.
- (2) Barisal Farm.
- * (3) Chinsurah and Gosaba Farms.
- * (4) Bankura and Suri Farms.
- (5) Other District Farms.

(1) **Dacca Farm.**—Here research on the improvement of highland aus, transplanted aman, and broadcast aman (deep-water) paddy varieties was continued.

Highland aus.—All the experiments under the heads collections, pure-line study, selection study, tests of improved strains, observation and selection of fixed hybrid strains were continued as usual as reported previously. Altogether 983 strains of aus paddy were under study.

The new experiment conducted during the year under report was a preliminary test with 32 early strains. We are in need of a large number of early maturing strains and we are attempting to select some desirable ones from all the material that is available with us. The land for this preliminary test was taken from the farm and this the farm gave us from their aus area. As according to the rotation aus follows sugarcane, the plot was extremely un-uniform for our purpose. The furrows which were manured for the sugarcane, were richer than the ridges, and footpaths. The result was that we got a very uneven growth.

The analyses of the results of all the aus tests will be seen in Appendix I-A.

Multiplication.—All the available space was utilised for multiplication of improved recommended strains. The land suitable for growing aus paddy by this section is very limited. Consequently it could not be possible to cope with the demand for our pure seed for farm sowing in the various districts. There was demand for 329 maunds but 28 maunds only could be supplied.

Transplanted aman.—In this group of paddy also all the experiments under the heads pure-line study, selection study, tests of improved strains against one another, the three cultural experiments, the experiment to study the effect of dusting paddy plants with some larvicides, as are used in anti-malarial works on the yield of grains, and the experiment to study the effect of weeding and non-weeding of "Jhanji" and other weeds on the growth and yield of the paddy were continued during the year like last year, already reported. Altogether 2,132 strains of transplanted aman paddy were under study.

Similarly genetical study of the hybrids were continued as reported last year.

The new experiment conducted during the year under report was a quasi-factorial experiment with 81 selected hybrid strains. The

*Work of the Rice Research Scheme financed (partly) by the Imperial Council of Agricultural Research, India, were carried on.

object of undertaking the experiment was to find out within as short a period as possible the high-yielding strain from among a large number of strains. Eighty-one selected hybrid strains were in the experiment. The design of the lay-out of the experiment was done in consultation with the Statistical Laboratory, Calcutta. The nature of arrangement was that of a partially balanced incomplete randomised blocks. There were 36 blocks with 9 strains in each block.

There were four groupings:—

- (i) Rows.
- (ii) Columns.
- (iii) Orthogonal square (1).
- (iv) Orthogonal square (2).

The analyses of results so far done of all the tests and experiments with the paddy will be found in Appendix I-B.

Broadcast aman (deep-water paddy).—At the outset it must be said that the conditions obtainable in our experimental area of the paddy are only favourable for such paddies as will be able to grow in water up to the depth of 7-8 feet only. For experimenting on paddies which would grow in deeper water some other suitable area will have to be procured. Consequently we are confining ourselves at present in investigating into the improvement of medium deep-water paddy. This also we are doing against many odds, such as insufficient labour budget, without contingencies and inadequate godown facilities. It is essential to remove the above difficulties for proper and smooth working, if experiment on the improvement of the paddy is desired earnestly.

This year 387 pure-line cultures were grown after rejecting the splitting and shattering ones. Only records of water height could be kept, growth of the plant with the rise of flood water could not be recorded for each pure-line culture due to lack of funds. This is a very important item of observation which must be recorded in order to select the strains having the capacity of quick growth with the rise of flood water. Notes on natural submergence and its effect on the individual culture were recorded.

There were two lots of selected strains—one lot comprising strains were grown in a plot where water could rise up to 4 feet and the other lot in a plot where water could rise up to 6 feet.

A test of selected strains was also conducted—

Strain	...	...	8
Replication	...	...	5
			<hr/>
			40
			<hr/>

unit plots $\frac{1}{120}$ acre each, in randomised blocks.

The maximum depth of water was $6\frac{1}{2}$ feet in the area where this test was conducted, one strain remained submerged for 7 days and yet survived.

The analyses of the result will be found in Appendix I-C.

(2) **Barisal Farm.**—Here experiment on the improvement of Balam rice (a class of transplanted aman trade paddy) is done.

The experiments on pure-lines study, study of selected strains and tests of selected and improved strains were continued as usual. The analyses of the results of tests will be found in Appendix I-B.

Two new strains of salt-resistant paddy obtained from Hongkong and Nigeria were introduced in the pure-line culture grown at the Barisal Farm. The strains were also multiplied at the Charbadna Farm on the river bank.

(3) **Chinsurah (Rice Research Station) and Gosaba Farms.**—A full report of the work done during the year under review has been submitted to the Imperial Council of Agricultural Research. A summary of the work done is given here.

(i) *Botanical study and isolation of pure-lines.*—Botanical study and isolation of pure-lines were continued. The total number of cultures during the year was 2,056 of which 1,690 were established pure-lines.

(ii) *Correlation study in rice.*—For a given strain of aman paddy the yield of grain is significantly associated with weight of straw, tiller, height, spikelet, length of inflorescence, flowering period, flag breadth and flag length; but when compared between strains weight of straw, tiller and height are significantly associated with yield. This agrees in general with the results of previous years.

(iii) *Combined varietal and nitrogen and phosphate experiment.*—It is a three-fold complex experiment which has been started during this season in order to study the relative effects of different doses of nitrogen and phosphate singly and in combination on different varieties of rice. There were three varieties of rice, three levels of nitrogen and three levels of phosphate. The highest yield was obtained with Latisail and was significantly superior to both Patnai 23 and Bhasamanik. The yield of Patnai 23 was also higher than Bhasamanik and the difference was statistically significant. The improvements in the yield due to application of 20 pounds and 40 pounds of nitrogen per acre have been found to be definitely significant. But the response to nitrogen at the three levels used in the experiment was following a linear law. There was no significant improvement in mean yield due to application of either 20 pounds or 40 pounds of P_2O_5 per acre. The first order interactions as well as the second order interaction were all insignificant.

(iv) *Study of the effects of age of seedling and date of planting on the yield of rice.*—The crop was a failure owing to abnormal flood condition.

(v) *Study of the effects of irrigation on the yield of rice.*—The experiment was started during the year 1937-38 and it was repeated during this season with slight modifications. It was a two-fold experiment with two irrigation treatments and two varieties. Both the primary effects as well as the interaction are significant. A considerably higher yield was obtained with "Irrigation" and is significantly superior to "No irrigation" treatment.

(vi) *Study of the effects of "Jhanji" (Algal weed) on the yield of rice.*—The crop failed due to flood.

(vii) *Varietal tests*.—Eight varietal tests were conducted during this season, of which two of them were total failures due to flood. The results of this year refer to a very abnormal flood condition and did not tally with the results of previous years.

(viii) *Selection*.—Two selection experiments with 49 and 81 strains of paddy respectively were conducted during this season after Yates' "Quasi-factorial" design. But both the experiments failed owing to flood.

(ix) *Hybridization*.—Study and selection of homogeneous types from the hybrids with special reference to yield and quality was continued.

(4) **Bankura (Rice Research Station) and Suri Farms**.—A full report of the work done during the year under review has been submitted to the Imperial Council of Agricultural Research.

A summary of work done is given below:—

Selection series experiments at Suri Farm comprising of two groups of eight strains in each of the four situations were continued without any change of lay-out and treatments as in the previous two years. The results obtained in the two higher situations agree more or less with the results of the two previous years. But that of the two lower situations are very varying and the experiments should be continued for some more years to get definite results.

The semi-final yield trials in four situations at Suri Farm were continued without any change on fairly big-sized plots. Excepting the performance of one or two strains the results obtained are very varying and the experiments should be continued for at least another year.

The study of hybrids at Suri Farm was continued. Two of the hybrids were in the fifth generation and three were in the sixth generation. Selection of promising strains on the basis of different economic characters was continued.

A yield trial was undertaken at the Sriniketan Farm of the Viswa-Bharati Institute at Bolpur with two groups (early and late) of five strains each. The results differ from that of Suri Farm. It should be continued for another year for confirmation of the result obtained. Paramannasail in the late group shows the same result for two years.

The pure-line and new collection cultural plots at Bankura Farm were 1,057 against 1,014 of the previous year. Usual character notes were recorded and single plant selection of types from splitting plots was continued.

There were for preliminary yield trials at Bankura Farm corresponding to the four situations were remodelled by introduction of new strains and rejecting low-yielding and late flowering ones from the group, $K \times I$ (36) and Nona-Ramsail in the 2nd and 3rd situation maintained their superiority.

There were four semi-final yield trials corresponding to the four situations. Of these two in the lower situations are newly started. The varieties in the older two experiments were reshuffled and shifted according to the flowering dates. Thus all of these experiments begin a new series. Ashkata in Situation I, $K \times I$ (36) in Situation II and Nona-Ramsail in Situation III are outstanding in performance.

The scented paddy yield trial was continued with the same treatments on a different piece of land. Gandhamalati which was sixth in the last year comes to the top. But Bansmati and Randhunipagal which were the best performers last year show good results this year also occupying 2nd and 3rd places, respectively.

A complex manurial experiment comprising of three factors with four replications was started in the year. The design was of latest technique. The result obtained shows that nitrogen manure in the form of ammonium sulphate is effective in increasing the yield of rice, but phosphoric acid does not show similar result. The second and third order interactions are all insignificant.

A complex cultural experiment with three factors, viz.: Variety × weeding × hoeing was started in the year on the same design as the manurial experiment noted above. The results obtained show that weeding and hoeing of the transplanted crop do not increase the yield of rice significantly. As there was a slight defect in the cultural treatment of weeding, which was detected late, the results cannot be relied on. Next year the defect will be mended.

Storage and viability experiment was continued. Seeds of 1936 stored in glass jar with lid made air-tight by the application of vaseline were still germinating in February 1940. No other storage treatment was effective in keeping the viability of paddy seed. The old seeds should be sown in the next year to watch their performance in the field.

Study of hybrids at Bankura Farm was continued as in previous years.

(5) **Other District Farms.**—There were altogether fifteen district farms where field tests of the improved strains evolved by the section of aus and transplanted aman paddy were conducted against the best local variety of the district.

The improved aus strains stood first in ten farms, while the local strains headed the list in remaining farms. Attention is being given to substitute other suitable improved strains at these farms, and also to isolate pure-line strains from samples collected of the local varieties.

Malda Farm showed exceptionally good result this time—Dharia and Katakara giving 42.9 maunds and 40.2 maunds per acre, respectively.

The analyses of the results of all the aus tests are given in the Appendix I-A.

The field test of improved strains of transplanted aman paddy was conducted in ten district farms. In all the farms our improved strains have stood first with significant difference in yield over the local varieties except in the Barisal Farm test, where in one test the local paddy although headed the list yet the difference of yield was not significant.

Wheat.—Experiments on wheat were conducted in three places, viz., Rajshahi Farm, Pabna Farm and Malda Farm under the heads: pure-line study, study of selected strains and test of improved selected strains.

Wheat seems to suffer from want of rains in different places of Bengal in different years. Where irrigation facilities are available,

one irrigation at the time when rains fail helps to obtain good crops. Successful cultivation of wheat in the province seems, therefore, to depend to a great extent on the facilities of irrigation.

The analyses of the results of wheat tests will be found in Appendix 2.

Pulses (*Phaseolus* sp.).—*Kalais and Mungs.*—The Kalai and Mung pure-lines were grown at Krishnagar Farm. A few promising strains were selected last year from the pure-line. With these a test was conducted this year. The analysis of the result of the Kalai test will be found in Appendix 3.

Fruit Culture—Dacca Farm.—A few good varieties of litchi plants obtained from Horticultural Station, Sabour, for trial here last year were planted, and old and inferior quality plants were removed and replaced by plants from China No. 3.

Pomeloes have also been multiplied in available spaces. Grape fruit plants bore fruit for the first time. Fruits were of quite big size and full of juice.

All the plants were manured by surface dressing with bonemeal, wood ashes and leaf moulds. The citrus plants received a dressing of sulphate of ammonia and lime in addition to the above manures.

Propagation experiments were continued as usual, and a number of grafts and gooties were supplied to the Suri Farm and Horticultural Station, Krishnagar, and Bankura Farm.

Thirty-nine seedlings of Tungoil plants (*Aleurites* sp.) have been raised and kept ready for transplantation in the beginning of the rainy season.

Bankura Farm.—Most of litchi plants could not survive the heat of last summer in Bankura. The citrus were attacked with leaf spot disease and also with scale insects. Arrangements were made for regular and periodic spraying the plants with fungicide and insecticides.

Suri Farm.—The pits which were dug last year on the tank banks of the farm were planted with grafts and gooties of pomeloes, litchies, guavas and citrus at the beginning of the rainy season. They were doing well.

Krishnagar Horticultural Station.—Weather conditions were very unusual, the excess in rainfall was about 17 inches. Damage to plants was considerable especially in the case of Malta oranges, papayas and bananas. The temperature was very high during April and May, the highest maximum being recorded was 115F. for three days. The winter was less severe compared to the previous years.

Work.—The work carried out during the year was, like the previous year, grouped in the following classes:—

- (1) Varietal trial.
- (2) Propagation experiments.
- (3) Manurial trial.
- (4) Collection of varieties.

Mango—Varietal trial.—The growth varied considerably from variety to variety and in different plants in the same variety. Out

of the twelve varieties Kohinoor, Safdar Pasand and Shadwala did not flower at all. The other varieties flowered but the number of plants in each varied from one to four, out of a total of six in each. The plants, young though they are, withstood the very trying climatic conditions well.

Propagation.—Enarching was, as usual, done for collection of varieties and the percentage of success was fairly high.

Collection.—The varieties, Bhowani Chowras, Bimli Pearafuli, Ananas, and Hajipur Langra were added to our collection from the garden of Babu Lalit Kumar Chatterjee.

Litchi.—This also showed varied growth like mango and withstood the severe and trying conditions similarly well. Only one plant of Kasba variety flowered during the year.

Collection.—Three varieties from the garden of Babu Lalit Kumar Chatterjee were added to our collection.

Papaya—Varietal trial.—The old plot was maintained and the South African variety proved to be the best one.

Citrus.—Malta oranges had flowered and fruited very well in collection as well as in liming plots. But unfortunately all the fruits dropped down on account of heavy rains. Santra plants gave only three fruits. Seedless Kagzi proved to be an outstanding success. It bears fruits of high quality throughout the year. All the budded Kagzi lemon plants from Poona succumbed to Citrus Canker and were removed and burnt. Sweet lime and seedless Kagzi have been put in their places.

Collection.—Everbearing Pati and Kagzi lemons, Marsh's Seedless Grape Fruit and Washington Naval Oranges were added to our collection.

Guavas.—Benares gave the highest yield, one plant giving as high as 1,337 fruits. Average fruit was heaviest in case of Lucknow. Benares maintained its high quality as well.

Multiplication of varieties was done. Allahabad Safeda was added to our collection.

Pine-apple.—As in previous years the Queen variety was the most successful. Clonal study is being continued.

Bananas.—The varietal trial plot was under two to three feet of water and only a few fruited.

Manurial trial.—Compost alone appeared to give the best result.

New versus Acclimatised.—In this experiment it was observed that in case of the comparatively coarser varieties, namely, Shabri and Chini Champa the acclimatised ones gave better result, while in case of finer ones, namely, Kanai Banshi and Martaban the new ones gave better result.

Clonal study is being continued.

Tomato.—Of the six varieties in the varietal trial, namely, Bonny Best, Early Large Red, Earliana, Main Crop, Scarlet Topper and Marglobe, this year Main Crop did best.

Seed Farms.—Babu R. N. Goswami, B.Ag. (Bom.), held charge of Paddy seed farms throughout the year under report and spent 107 days on tour. The important private seed farms were inspected as

usual. Different stocks of both aus and aman paddy seeds were examined, and tested for seed supply and necessary instructions were given to the growers as to purity, storage of seeds and methods of improved cultivation. This year a total area of 3,891 acres was covered with free supply of departmental aus and aman paddy seeds distributed in 336 demonstration centres and 118 Union Board Farms in the districts of Bengal, some of these farms were inspected during the year under report. Departmental paddies are gradually making their headways in the districts. The supply of 208 maunds 20 seers of Boro paddy seeds were arranged for the Collector, Howrah.

A grant of Rs. 1,000 was received again this year for the Patnai paddy demonstration, 244½ maunds of Patnai paddy No. 23 seeds were purchased from the grant, and the seeds were freely distributed to 590 *bona fide* growers in the eight districts, namely, Bakarganj, Jessore, 24-Parganas, Khulna, Noakhali, Hooghly, Burdwan and Dinajpur. The standing crops of this variety were inspected from time to time and the growers were told about the important points of its successful cultivation. By two years' free distribution of seeds, the departmental strain has expanded to an approximate area of 14,828 acres. The acreage would have been still more, had the crop not suffered from adverse effect of heavy rainfall and flood. The yield of the above paddy, grown this year in the districts is as follows:—

	Maunds per acre.
(1) District Burdwan	... 15 to 36
(2) District Khulna—	
(i) Sadar	... 24 to 30
(ii) Bagerhat	... 18 to 24
(iii) Satkhira	... 18 to 36
(3) District 24-Parganas—	
(i) Diamond Harbour	... 24 to 36
(ii) Basirhat	... 20 to 36
(4) District Noakhali—	
(i) Sadar	... 20 to 32
(ii) Sandwip	... 18 to 20
(5) District Bakarganj	... 24 to 30
(6) District Hooghly	... 21 to 30
(7) District Jessore	... 28 to 30
(8) District Dinajpur	... Poor yield.

On the whole, Patnai paddy displayed its superiority in yield over local varieties and it was noticed that the Patnai paddy could resist flood to some extent, while the local varieties grown along side could not at all survive. This year a very promising outturn of 45 maunds per acre was found to be obtained from a crop of Patnai paddy by a grower named Mejo Miah of Kholapota in Basirhat subdivision in the district of 24-Parganas. Patnai paddy is gaining more and more its popularity over the local varieties in several districts of Bengal.

Mycology.—Babu P. C. Kar was the Mycological Assistant during the year under report.

The Fieldman Babu Bimal Ranjan Ganguly worked throughout the year.

Tour.—Babu P. C. Kar spent 71 days and Babu Bimal Ranjan Ganguly 52 days on tour during the year.

Diseases.—The following principal diseases were dealt with:—

Betelvine.—The betelvine boroj set apart at Dacca Farm for the selection of resistant varieties was infected with soil brought from a diseased boroj on 14th October 1939.

From 8th November 1939 the vines began to wilt and the diseases which were observed during the year under report may be seen in the Appendix IV.

Demonstration.—An application from the Baruijibi Association, Khulna, to redress their grievances regarding the diseases of pan was submitted to the Hon'ble Minister, which was forwarded to the Director of Agriculture, Bengal, for necessary action.

At the request of the Collector, Khulna, a grant of Rs. 85 was sanctioned by the Director of Agriculture, Bengal, for the purchase of two compressed air sprayers and some fungicides for carrying out the work in pan borojes. Spraying demonstration was given twice by the Mycological Assistant and his Fieldman in five villages, viz.,—Senhati, Formajkhana, Diara, Maheswarpasa and Atra, but it is sad to note that in spite of getting all facilities the Association had neglected in carrying out the work. The parties were given to understand that the fungicides will act as a preventive. In order to get salutary result the treatment should be repeated at regular intervals, i.e., once a month.

Spraying demonstration was also given in three more villages of district Khulna and one village of district Howrah during the year.

Necessary advice regarding the treatment of pan borojes was given to the following parties:—

- (1) Babu Sachindra Nath Roy, Manikdah, Faridpur.
- (2) Babu Sachindra Nath Maithi, Midnapore.
- (3) Dr. Saileswar Das, member, Union Board, Domjoor, Howrah.
- (4) President and Secretary, Khulna Baruijibi Association.
- (5) Babu Hirendra Nath Bhowal, Vikrampur Trading and Manufacturing Co., Ltd., Dacca.
- (6) Babu Gopal Chandra Das, Murakata, Midnapore.

Paddy diseases.—During the latter part of June 1939, a severe attack of Pircularia was observed on all the varieties of aus paddy at Dacca Farm. The disease gradually disappeared with the maturity of the plants. During the same month practically all the seed-beds of aman were also attacked with the same disease. It is interesting to note that the seed-beds which were situated at a lower situation and had sufficient moisture in the soil were practically free from the attack. Sulphur dusting and spraying with $\frac{1}{2}$ per cent. Bordeaux mixture were given to the seed-beds of aman and the virulence of attack was brought under control. With the setting of the rain from 11th July 1939, the condition of the seedlings was greatly improved.

Helminthosporium.—Soon after the attack of *Piricularia* had subsided on the aus paddy, they were attacked with *Helminthosporium* during August 1939. The disease continued to develop till the time of harvest. More or less all the varieties of aus paddy were attacked, but the disease was more severe on Dharial, P S (8) and Solai. The manurial experimental plot at Dacca Farm, which was sown with Dharial had also suffered severely from the attack of *Helminthosporium*.

Treatment of aus paddy seeds.—About 285 maunds of aus paddy of Dacca Farm and 50 maunds of the Economic Botanist, Bengal, which were more or less attacked with *Helminthosporium* were treated with corrosive sublimate solution. The seeds were first steeped in a concentrated solution of salt at 6 chattaks in 1 seer of water. Light grains floating on the surface of water were then removed. The seeds settled at the bottom were then washed with ordinary water and treated for 20 minutes in corrosive sublimate solution at 1 in 2,000 parts of water. The seeds were then taken out of the solution, dried in shade first and finally in the sun. The germination was taken and found fairly good.

During October 1939 Latisail paddy of Pabna Farm was attacked with *Helminthosporium*. Seed treatment with corrosive sublimate solution was recommended.

Pan-Sukh—a physiological disease of rice plants, was reported by the Rice Research Officer from Suri Farm. Draining the water out of the fields was recommended. Where that is not possible it is advised to apply ammonium sulphate at 30 to 50 lbs. per acre. Paddy seedlings sent by the Rice Research Officer, Chinsurah, were found attacked with *Helminthosporium*. Seed treatment with corrosive sublimate was recommended. During November 1939 in some of the fields of Bhasamanik at Maslandpur, 24-Parganas, stunted paddy plants were found growing in patches having no panicles on them. It appears that the arrested growth was due to some unfavourable soil condition.

Sugarcane.—During September 1939 a severe attack of Red-rot was reported on sugarcane mostly on Co. 213, from the districts of Murshidabad and Birbhum. Due to the rising of the rivers the fields were submerged under water and about 50 per cent. of the plants of Ramghat, Brahmanpara, Benipara in Karmanhar, Jamna and Tibi Union of Labpur thana in district Birbhum were attacked with Red-rot. It was reported that about 1,000 acres of sugarcane in the above three unions were more or less affected. From the examination of the fields it was noticed that the ratoon canes were mostly affected. As preventive measures the cultivators were advised (1) to uproot all their diseased clumps immediately from the fields and destroy them by burning, (2) cuttings for next year's crop should on no account be selected from diseased fields and (3) the cut ends of all the cuttings should be thoroughly examined before planting and any set showing red marks at the cut should be rejected. Departmental leaflets on the preventive measures were also distributed by the Agricultural Chemist, Bengal, in the affected areas. During January 1940, some sugarcane specimens were sent by the Agricultural Demonstrator, Kandi, Murshidabad, through the District Agricultural Officer, Berhampore. On examination they were found attacked with Red-rot. Removal of diseased plants from the field and set-selection at the time of planting were recommended.

Cotton.—Reports on cotton wilt-Fusarium were received through the Second Economic Botanist, Bengal, from Sarenga, district Bankura;

Mainamati Centre, district Tippera; **Murshidabad Cotton Centre** and **Rajshahi Farm**. It was recommended to uproot the diseased plants and destroy them by burning. During January 1940, Dacca No. 12 of the Second Economic Botanist, Bengal, which was mainly grown for seed purpose, was severely attacked with Anthracnose-Glomerella. The disease was brought under control by spraying the plants with $\frac{1}{2}$ per cent. Bordeaux mixture.

Potato.—Potato tubers both Darjeeling and local seeds amounting to 8 maunds 10 seers were attacked severely with a Bacterial disease in the garden of the Civil Surgeon, Noakhali. It was recommended to destroy the affected tubers and not to grow solanaceous crops in the infested field for some time.

Linseed.—During December 1939, linseed plants of the Second Economic Botanist, Bengal, at Berhampore Farm were attacked with Fusarium. Destruction of diseased plants was recommended.

Rust.—(*Melampsora lini*) on linseed was reported from the College of Engineering and Technology, Bengal, Jadavpur, during March 1940. Removal and destruction of diseased plants were recommended.

Flax.—The cultivation of flax is gradually increasing in Bengal. This crop is attacked with a destructive disease—Rhizoctonia—which thrives better in sandy soil. (The symptoms of the disease that the plants present a prematurity ripe appearance.) Such plants when uprooted and examined showed a brown discolouration with shrinkage at the collar. During December 1939, on the river bank of Sitalakhya in Narayanganj, one-fourth of the seedlings in one corner of a plot were found attacked with disease and killed. For the sake of experiment this portion was ploughed down and the soil was sterilized by burning a thick layer of paddy straw and re-sown. The germination was very good and the crop is in excellent condition. During the same month a large number of fields sown with flax (Fibre Expert's experiment) in Gaibandha subdivision, district Rangpur, were also found attacked with Rhizoctonia.

Gram.—Gram "wilt" due to *Sclerotium Rolfsii* was reported from two Government Farms, Rajshahi and Berhampore. The recommendations made were (1) rotation of crops with a sufficient interval between two successive crops of gram to allow the fungus to die out and (2) systematic removal and burning of the wilted plants as they are a source of damage owing to the formation of "Sclerotia" on the surface of the stem.

Jowar.—The Jowar (*Andropogon Sorghum*) of the Second Economic Botanist, Bengal, at Dacca Farm was for the first time found severely attacked with smut (*Sphacelotheca Sorghi*). It was recommended to get the diseased plants removed and destroy them by burning. Seed treatment with formalin solution before sowing was recommended.

Brinjal.—Brinjal plants in district Midnapore were attacked with a Bacterial disease. It was recommended to collect the seeds from the surviving plants and to sow them next year in other fields.

Examination.—The students of the Second Year Class, Agricultural School, Dacca Farm, were examined in Mycology.

Crop Reports.—Thirty-nine reports of different crop diseases were received and reported on during the year.

Exhibition.—The Mycological Assistant attended the Agricultural and Industrial Exhibition at Mymensingh and delivered lectures on crop diseases to a batch of Union Board members by means of lantern slides.

Coloured Plates.—Thirteen sets of coloured plates of different crop diseases were prepared and supplied to the Deputy Director of Agriculture, Northern Circle, and the Deputy Director of Agriculture, Western Circle, and to the Propaganda Officer, Bengal.

Imperial Mycologist, New Delhi.—The following work was carried out by the Imperial Mycologist, Research Institute, New Delhi, for Bengal during the year under report:—

- (1) Professor S. N. Banerji of Ripon College, Calcutta, and Mr. A. K. Ghosh of Calcutta University received training in Mycological Technique and methods of research. Mr. S. P. Ray Chaudhuri joined the Mycological Section, Imperial Agricultural Research Institute, as a post-graduate research worker in October 1939.
- (2) Information about books on virus diseases of plants was supplied to the Botanist, Dacca University.
- (3) Eleven specimens of leaf-invading fungi were identified for Professor S. R. Bose of Carmichael Medical College, Calcutta.
- (4) Leaves of *Typhonium trilobitum* were examined for Mr. A. K. Ghosh of Calcutta University. They were found to be attacked by a species of *Cercospora* associated with a species of *Colletotrichum*. This is the first record of these two fungi from this host in India. Mr. Ghosh was also supplied with twenty specimens of fungi for his class work.
- (5) Twenty-four cultures representing various groups of fungi were given to Professor S. N. Banerji of Ripon College, Calcutta. He was also supplied with forty specimens of important crop disease fungi in exchange for fifty specimens of bracket fungi which he presented to the Imperial Mycologist.
- (6) Tomato plants sent by the Economic Botanist, Bengal, were found to be suffering from bacterial wilt, apparently due to *Bacterium solanacearum*.
- (7) Leaves of mulberry (*Morus alba*) were examined for the Botanical Officer, Sericultural Experimental Station, Dum Dum. They were found to be infected with *Phyllactinia corylea* (Pers.) Karst. A full account of this disease was supplied.
- (8) A fungus from the roots of *Morus alba* was identified for Professor Agharkar of the University College of Science and Technology, Calcutta, as *Diplodia morna* Syd.

Entomology.—Babu P. C. Sen held charge of the section up to July 1939. After his retirement Mr. Md. Abdul Hakim Bhuiya was appointed to the post of Entomological Assistant who took charge of the office on the 5th August 1939. Mr. Md. Mazharuddin Qureshi was appointed as an Additional Entomological Assistant in the month of January 1940.

Tour.—The Entomological Assistants were on tour for 89 days.

Paddy—(1) *Rice stem-borer* (*Schoenobius bipunctifer*, Wilk).—The pest had badly attacked the transplanted paddy of the Dacca Farm and their activities were also observed in the districts of Dacca, Mymensingh, Tippera and Noakhali. In the Dacca Farm the borers were kept in check to a great extent by the appearance of (1) two species of Chalcid egg-parasites which parasitised a large number of egg-masses; (2) by letting out water from the plots. The egg-parasites have not yet been identified. Further observation on them will be made during the next season.

(2) *Rice swarming caterpillars* (*Spodoptera mauritia*, Bois).—This pest was reported from Noakhali and Alipur Duars, Jalpaiguri. In the former case two villages were affected but the caterpillars were washed away by heavy rainfall and sudden rise of the river water nearby, submerging the paddy fields. But in the latter case four villages were affected and the caterpillars were either eaten up or killed by flocks of "Goo Bock" cattle Egret (*Bubulcus coromandus*). These white birds eat cattle ticks and are seen along with cattle grazing in low lands. These Egrets should not be disturbed or driven out from the rice fields. Sometimes hunters shoot them indiscriminately; this practice must be stopped and the introduction of these birds must be encouraged at the time of appearance of the caterpillars by grazing the cattle near the rice fields.

(3) *Rice Hispa* (*Hispa aenescense*, Baly).—The pest appeared in the rice plots of the brick-field area of the Dacca Farm and about two bighas were so badly attacked that the leaves first turned yellow and then withered away. This pest was successfully controlled (1) by letting out water from the plots and (2) by spraying with a mixture of kerosene emulsion and Pyroicide 20.

The method of application is described below:—

With two seers of kerosene emulsion 2 chattaks of Pyroicide 20 was mixed with a hand sprayer and the mixture was diluted 5 to 8 times with water. When most of the pupae emerged as adult Hispa, the mixture was sprayed with a compressed sprayer. The spraying had a deadly effect on the pests. They all fell into the water below and died after some time.

Sugarcane.—(1) *Top-borer* (*Scirpophage nivelia*, F.).—The moths appeared early in March in the Dacca Farm on ratoon seedlings, but their first batch of egg-masses on new plantation was observed in the beginning of April 1939. The pest in all the district farms was kept in check by removing and destroying "dead hearts".

(2) *Stem-borer* (*Argyria tumidicostalis*).—This borer along with top-borer and termites caused a great damage to the canes of Mohanpur Farm in the district of Dinajpur. The pest was kept in check to some extent in places where early precautions were taken and "dead hearts" removed.

(3) *Pyrilla* (*Pyrilla pusana*, Dist.).—The hoppers appeared in millions in the cane tracts of Rajshahi and Dinajpur districts and were also reported from Jinardi, Dacca. In Sardah area of Rajshahi district thousands and thousands of these Pyrilla were found dead on the leaves spreading their wings along with their nymphs. A species of fungus was found growing on their body. Egg-parasites also kept the hoppers in check to some extent.

Wheat.—During the last three years “click beetle” (*Elateridae*) larva had been a bad pest on pure-line wheat experimental plots in Rajshahi Farm. This year it was successfully combated by using “Seaky Soil Fumigant” at the rate of about $\frac{1}{4}$ tolla at a depth of 4 inches within 2 sq. ft. The fumigant can be had from Messrs. Imperial Chemical Industries (India), Ltd., Calcutta.

Cotton.—(1) *Stem-borer* (*Sphenoptera gossypii*, Kerr).—The larvæ were found boring cotton stem at Sarenga Cotton Centre in Bankura district. Cutting and burning of the affected stems kept the pest in check.

(2) *Cotton leaf roller* (*Sylepta derogata*, F.).—The larvæ were seen rolling cotton leaves at Sarenga, Midnapur and Dacca Farms. They were kept controlled to a great extent by hand-picking.

(3) *Scale insects* (*Cerococcus hibisci*, Green).—The scales were found very bad on ratoon cotton plants in Midnapur district. A Chalcid parasite destroyed a large number of the scales.

Flax.—(1) *Hairy Caterpillars* (*Diacrisia obliqua*, Wilk) and semi-looper larvæ were observed eating leaves at Gaibandha and Dacca Farms. In the flax plots of the above places top portion of some of the plants was found swelled, like gall formation. After examination two maggots were found in two stems.

(2) *Cut-worms* (*Agrotis ypsilon*) totally damaged a plot at Narayanjanj. Within one square yard more than a dozen larvæ were dug out from that plot. The caterpillars either ate up the cortical tissue, the leaves or cut down the plants at ground level.

Mustard.—(1) *Mustard saw fly* (*Athelia proxima*, Klug).—The pest was reported from Dinajpur Farm and Basirhat, 24-Parganas. Hand-picking kept the pest under control.

(2) *Aphids* (*Aphis brassicæ*, Linn).—The pest caused a great loss to mustard in Gaibandha subdivision of Rangpur district. It was observed at the time of harvesting when it was too late to take any remedial measures. The cultivators believed that the disease was due to “Uttaria Hawa” (northern wind).

Musk mallow.—*Earias favia*, stoll, badly attacked the Dacca Farm plots. The larvæ entered the stem through the top portion. Spraying was not successful owing to excessive rain. It was kept under control by removing the affected top portion and destroying the same.

Stored pulses.—Bruchid beetles (*Bruchus chinensis*, Linn) found eating stored pulses (*Phaseolus mungo*).

Cabbage and cauliflower.—Red ants damaging cabbage roots were reported from Bogra. Aphids (*Aphis brassicæ*, Linn) were successfully controlled by spraying with 5 per cent. solution of kerosene emulsion in the Dacca Central Jail Farm.

Fumigation.—Many rat holes and termite moulds were fumigated with calcium cyanide A-Dust. Large samples of paddy and pulses were fumigated with CS₂.

Selection of cane cuttings.—Several thousands of cuttings were selected for distribution. Top-borer, stem-borer and mealy bugs were found among the setts.

Exhibition.—Many show cases on different crop pests were supplied for exhibitions. Lectures on control of insect pests were delivered to the Union Board representatives who were called upon in connection with the Agricultural Exhibition at Mymensingh.

Training.—The students of the Dacca Secondary Agricultural School were shown all the different crop pests of Bengal. The principles of control of insect pests and the uses of sprayers were explained and demonstrated to them. They were also examined on Entomology in their final examination.

Parcels and correspondence.—Several parcels with samples of insect pests were received and reported on. About eighty-four calls were made on crop pests. All the correspondents were replied to and where possible urgent cases were attended to.

Programme of work for the year 1940-41.—(1) To study the life-history of Chalcid egg-parasite of rice stem-borer (*Schoenobius bipunctifer*, Wilk) and possibility of its mass productions and liberation as biological control of rice stem-borers.

(2) To study the possibility of introduction of Lady Bird beetles as predators on Mustard Aphis (*Aphis brassicae*).

(3) To carry on further experiments with kerosene emulsion and Pyrocyde 20 for controlling Rice Hispa (*Hispia aenescense*).

(4) To experiment with the fungus recently observed destroying the nymphs and adults of the sugarcane hoppers (*Pyrrilla nigriventris* and *P. purpusilla*).

(5) To collect and to study different larval parasites of sugarcane top and stem-borers.

Schemes for investigation of sugarcane pests.—According to the instructions from New Delhi the following staff was appointed in February 1939 to carry on the survey work in Bengal in connection with the scheme for research on insect pests of sugarcane:—

Entomological Assistants	... 2
Entomological Fieldmen	... 4
Laboratory Keepers	... 2

It was decided by the Imperial Council of Agricultural Research that two regions should be selected in the East and West Bengal for survey work with the headquarters at Berhampore and Dacca, respectively. One Assistant with his staff consisting of 2 Fieldmen and one Laboratory Keeper was to remain at Dacca and the other Assistant with his staff was to go to Berhampore. Both the Assistants with their staff were, however, detained in Dacca for about 3 months to let them get acquainted with the work which they were to carry on separately. On 1st May 1939 Mr. Md. Mazharuddin Qureshi, Entomological Assistant, was transferred to Berhampore with two Fieldmen and one Laboratory Keeper, and Mr. Md. Abdul Hakim Bhuiya, the other Assistant, and the remaining staff were posted at Dacca.

Eleven stations were selected for monthly examination in each region covering the districts of Dacca, Mymensingh, Comilla, Noakhali, and Chittagong in the East and Murshidabad, Nadia, Faridpur, Pabna

and Rajshahi in the West Bengal. The work of the staff in both the regions consisted of going round and round the selected stations every month in order to examine the selected fields according to the statistical plan received from New Delhi, and collecting insect pests. The collected specimens and the monthly reports on the results obtained by the examination of the selected fields were regularly sent to the Imperial Agricultural Research Institute, New Delhi.

On 5th August 1939 Mr. Md. Abdul Hakim Bhuiya, the Entomological Assistant, Dacca, was appointed as Entomological Assistant to the Government of Bengal and so Mr. Md. M. Qureshi, the Entomological Assistant of Berhampore, was called back to Dacca on 11th August 1939 to take charge of this centre in addition to his duties at Berhampore till the appointment of another Assistant. Babu A. B. Mitra was appointed Entomological Assistant for Berhampore in September 1939 and he took charge of that station on 11th October 1939. In February last Mr. Md. M. Qureshi was also absorbed in the department as Additional Entomological Assistant. In the meantime instructions were received from the Imperial Council of Agricultural Research to abolish the Berhampore Centre, leaving only one centre, namely, Dacca for the whole of Bengal. Consequently Babu A. B. Mitra was transferred to Dacca to fill up the vacancy caused by Mr. Md. M. Qureshi and the Berhampore Centre was abolished.

Correspondence.—The section dealt with 5,678 letters during the year under report.

The staff of the section, as a whole, had put in strenuous services during the year due to the increased activities of the section and deserve my heartfelt thanks.

V.—Programme of work for 1940-41.—Investigations will be continued on the same lines as reported in the report. Special attention will be paid for raising pure seeds of the recommended types, and arrangement will be made to supply them to the Government Farms with a view to raise the standard of purity of the recommended paddies of the department grown in the District Farms. Attention will be paid also to extend the cultivation of Patnai paddy, Gosaba 23 in the rice-growing tracts of Sundarbans and other suitable places.

S. HEDAYETULLAH,

Economic Botanist to the Government of Bengal, Dacca.

APPENDIX 1-A.

AUS TEST (1939-40).

Dacca Farm—BOTANICAL SECTION (PRELIMINARY TEST WITH EARLY VARIETIES).

30 varieties 8 times replicated—area of sub-plot—1/363rd acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Block ..	7	12,270.27	1,752.89	..	..	..
Treatment ..	29	22,538.69	777.20	..	..	2.12*
Error ..	203	74,104.87	365.05	19.10	6.77	..
Total ..	239	108,913.83	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Boalia (250).	P × L (3).	K. P. F. (7).	Salta (65).	Hashikalmi.
	1	2	3	4	5
Maund per acre ..	13.84	12.31	12.02	12.02	11.80
Per cent. ..	127.44	113.35	110.70	110.70	108.65

Grain.	K. P. F. (1).	Dhakalam.	K. P. O. (8).	K. P. F. (6).	K. P. F. (8).
	6	7	8	9	10
Maund per acre ..	11.75	11.75	11.71	11.60	11.54
Per cent. ..	108.20	108.20	107.80	106.80	106.26

Grain.	K. P. O. (15).	K. P. F. (19).	K. P. O. (13).	Lalsaita (Tippura).	Manikmuda (Nadia).	K. P. F. (3).	Shaita (53).
	11	12	13	14	15	16	17
Maund per acre ..	11.37	11.28	11.21	11.21	10.86	10.75	10.73
Per cent. ..	104.70	108.87	103.22	103.22	100.00	99.00	98.80

Grain.	Krishna-kumar (Murshidabad).	Jagal B type (3).	Agoli (Netrakona).	Boalia (386).	Gariai (Bogra).	Shaita (Tangail).
	18	19	20	21	22	23
Maund per acre ..	10.63	10.48	10.25	10.19	10.18	10.14
Per cent. ..	97.88	96.50	94.38	93.83	93.74	93.37

Grain.	K. P. F. (2).	K. P. O. (1).	Boulam (Kishoreganj).	Kumarichapala (Jamalpur).	K. P. O. (12).
	24	25	26	27	28
Maund per acre ..	9.98	9.82	9.67	9.65	9.41
Per cent. ..	91.90	90.42	89.04	88.86	86.65

Grain.	Malchampa (Cooch Behar).	P × L (17).	General mean.	Error.	Critical difference.
	29	30	31	32	33
Maund per acre ..	8.89	8.62	10.86	0.77	2.15
Per cent. ..	81.86	79.37	100.00	7.00	19.80

DACCA FARM—BOTANICAL SECTION (TEST WITH EARLY VARIETIES).

5 varieties 7 times replicated—area of sub-plot—1/80th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Block ..	6	9.87	1.64	..	..	..
Treatment ..	4	20.12	5.03	..	..	4.98*
Error ..	24	24.43	1.02	1.07	.40	..
Total ..	34	54.42	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Chakulia (local).	P × S (8).	Marich- beti.	D × L.	Pukhi.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8
Maund per acre.	17.74	14.82	14.22	13.96	13.54	14.84	0.80	2.33
Per cent.	119.54	99.86	95.82	93.40	91.24	100.00	5.89	15.70

DACCA FARM—BOTANICAL SECTION (TEST WITH MEDIUM AND LATE VARIETIES).

12 varieties 7 times replicated—area of sub-plot—1/80th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	6	70.60	11.76	..	..	..
Treatment ..	11	96.23	8.75	..	..	7.00*
Error ..	66	82.30	1.25	1.10	.42	..
Total ..	83	249.13	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Kataktara.	Gorfa (local).	Surja-mukhi.	Panbira.	Atlal.	Larkoch.	Kumari.	Dhalral.
	1	2	3	4	5	6	7	8
Mauud per acre.	17.78	14.86	14.70	14.06	13.82	12.46	12.32	12.32
Per cent.	137.20	114.66	113.42	108.50	106.63	96.14	95.06	95.06

Grain.	Kalamgar.	Charnock.	Dhala Salta.	Solai (local).	General mean.	Error.	Critical difference.
	9	10	11	12	13	14	15
Mauud per acre ..	11.60	11.20	10.86	9.42	12.96	0.84	2.37
Per cent. ..	89.51	86.51	83.80	72.68	100.00	6.50	18.29

FARIDPUR FARM.

6 varieties 6 times replicated—area of sub-plot—1/40th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	5	478.73	95.74	..	..	..
Treatment ..	5	109.75	33.95	..	..	2.59*
Error ..	25	327.31	13.09	3.62	1.48	..
Total ..	35	975.79	..	..	..	..

*Not significant.

Summary of results.

Grain.	Parangl (local).	D × L.	Sandamam (local).	Pukhl.	Marichbetl.	P × S (S).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Maund per acre	16.10	15.46	15.00	14.00	10.91	10.58	13.54	1.48	4.31
Per cent. ..	118.97	114.24	110.85	103.46	80.62	78.18	100.00	10.93	31.83

COMILLA FARM.

7 varieties 5 times replicated—area of sub-plot—1/40th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	4	13.46	3.36	..	..	..
Treatment ..	6	122.49	20.41	..	..	4.40*
Error ..	24	111.36	4.64	2.15	0.96	..
Total ..	34	247.31	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Dhala Saifa (local).	P × S (S).	Kataktara.	Dharial.	Surjamukhl.
	1	2	3	4	5
Maund per acre ..	19.40	18.84	18.17	17.83	17.18
Per cent. ..	113.68	110.40	106.47	104.48	100.67

Grain.	Kumari.	Solai (local).	General mean.	Error.	Critical difference.
	6	7	8	9	10
Maund per acre ..	13.30	13.05	17.06	1.08	2.80
Per cent. ..	77.93	76.47	100.00	6.33	16.41

DACCA FARM.

10 varieties 5 times replicated—area of sub-plot—1/80th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	4	10.44	2.61	..	..	..
Treatment ..	9	48.49	5.39	..	..	3.28*
Error ..	36	59.05	1.64	1.28	.57	..
Total ..	49	117.98	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Kataktara.	Dharial.	P × S (8).	Panbira.	Chakulla.	Kumari.
	1	2	3	4	5	6
Maund per acre ..	11.25	10.00	10.00	8.75	8.75	8.37
Per cent. ..	53.00	47.20	47.20	41.30	41.30	39.40

Grain.	Paspal.	Garfa (local).	Solai (local).	Pukhi.	General mean.	Error.	Critical difference.
	7	8	9	10	11	12	13
Maund per acre ..	8.37	8.25	6.87	6.75	21.17	1.14	3.27
Per cent. ..	39.40	38.04	32.42	31.86	100.00	5.38	15.45

MYMENSINGH FARM.

6 varieties 5 times replicated—area of sub-plot—1/40th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	4	74.12	18.53	..	..	..
Treatment ..	5	118.90	23.78	..	..	14.50*
Error ..	20	32.73	1.64	1.28	0.57	..
Total ..	29	225.75	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Dhariai.	Katak-tara.	Paspai.	Chakulla (local).	P × S.	Pukhi.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Maund per acre ..	16.00	14.60	14.50	13.30	13.00	9.60	13.48	0.57	1.68
Per cent. ..	118.10	108.31	107.57	98.67	96.44	71.22	100.00	4.23	12.46

MAINAGURI FARM.

6 varieties 6 times replicated—area of sub-plot—1/50th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	5	48.65	9.73	..	..	..
Treatment ..	5	103.69	20.74	..	..	8.75*
Error ..	25	59.26	2.37	1.54	0.63	..
Total ..	35	211.60	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Kumari.	Dhali (local).	Katak-tara.	Dhariai.	P × S(8).	Surja-mukhi.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Maund per acre ..	22.70	20.20	19.57	18.95	18.32	15.62	19.23	0.78	2.27
Per cent. ..	118.04	105.04	101.76	98.54	95.26	81.22	100.00	4.05	11.80

PABNA FARM.

5 varieties 5 times replicated—area of sub-plot—1/60th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	4	39.21	9.80	..	..	..
Treatment ..	4	60.06	15.16	..	..	8.71*
Error ..	16	27.88	1.74	1.82	.60	..
Total ..	24	127.75	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Dhariai.	Surja-mukhl.	Katak-tara.	Paspai.	Kala-bakri.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8
Maund per acre ..	24.45	22.05	20.85	19.12	17.70	20.83	0.90	2.70
Per cent. ..	117.37	105.85	100.09	91.79	84.97	100.00	4.32	12.96

BOGRA FARM.

5 varieties 8 times replicated—area of sub-plot—1/80th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	7	41.28	5.90	..	..	..
Treatment ..	4	50.00	12.50	..	..	13.58*
Error ..	28	25.75	0.92	.96	.34	..
Total ..	39	117.03	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Local Inda.	P × 8 (8).	Katak-tara.	Marich-beti.	D × L.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8
Maund per acre ..	21.24	19.30	18.48	17.50	14.42	18.18	.68	1.97
Per cent. ..	116.82	106.15	101.64	96.25	79.31	100.00	3.74	10.84

RANGPUR FARM.

6 varieties 5 times replicated—area of sub-plot—1/50th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	4	23.80	5.95	..	..	..
Treatment ..	5	38.08	7.61	..	..	1.42*
Error ..	20	107.30	5.36	2.32	1.04	..
Total ..	29	169.18	..	..	..	..

* Not significant.

Summary of results.

Grain.	Dharial.	Kumari.	Katak-tara.	Sona-mail (local).	Surjamukhi.	P × S (8).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Maund per acre ..	36.50	35.87	34.90	33.50	32.00	32.87	34.43	1.30	3.83
Per cent. ..	100.01	104.18	101.36	97.30	92.94	95.47	100.00	3.78	11.12

RAJSHAHI FARM.

5 varieties 6 times replicated—area of sub-plot—1/40th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	5	53.51	10.70	..	..	..
Treatment ..	4	89.43	22.36	..	..	6.67*
Error ..	20	66.96	3.35	1.83	0.82	..
Total ..	29	209.90	..	..	..	..

* Significant at 1 per cent. level.

Summary of results.

Grain.	Paspal.	Marich-beti (local).	Marich-beti (Deptt.).	Dharial.	P × S (8).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8
Maund per acre ..	16.77	12.16	12.07	10.84	10.00	13.87	0.82	2.42
Per cent. ..	120.01	87.07	87.02	78.15	72.10	100.00	6.00	17.45

DINAJPUR FARM.

4 varieties 5 times replicated—area of sub-plot—1/80th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	4	81.92	20.48	..	..	..
Treatment ..	3	140.55	46.85	..	..	12.76*
Error ..	12	44.08	3.67	1.92	0.86	..
Total ..	19	266.55	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Kataktara.	Dwarikaraj (local).	Dharial.	Marichbeti.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7
Maund per acre ..	34.80	33.20	31.60	21.60	30.30	1.72	5.30
Per cent. ..	114.85	109.56	104.28	71.28	100.00	5.68	17.49

MALDA FARM.

3 varieties 8 times replicated—area of sub-plot—1/60th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	7	6.13	0.87	..	..	..
Treatment ..	2	414.83	207.41	..	..	81.34*
Error ..	14	35.71	2.55	1.60	0.57	..
Total ..	23	456.67	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Dharial.	Kataktara.	Jagal (local).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6
Maund per acre ..	42.93	40.21	25.86	37.17	3.45	10.46
Per cent. ..	115.48	108.16	68.21	100.00	9.28	28.14

BURDWAN FARM.

6 varieties 5 times replicated—area of sub-plot—1/40th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of Squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	4	87.19	21.80	..	..	..
Treatment ..	5	128.94	25.80	..	..	5.27*
Error ..	20	97.73	4.89	2.21	0.99	..
Total ..	29	313.86	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Jhanji.	Newall.	Jhuloor.	Bhut-marl.	New-achl.	Jata-kalam.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Maund per acre ..	24.90	24.85	22.20	20.90	20.80	19.40	22.17	0.99	2.92
Per cent. ..	112.29	112.07	100.12	94.25	93.80	87.49	100.00	4.47	13.17

BERHAMPORE FARM (LATE AND MEDIUM STRAINS).

9 varieties 5 times replicated—area of sub-plot—1/40th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of X.
Blocks ..	4	311.89	77.97	..	..	..
Treatment ..	8	329.09	41.23	..	..	4.32*
Error ..	32	305.71	9.55	3.00	1.39	..
Total ..	44	946.69	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Baradana (local).	Jagal (local).	Marich-beti.	Paspal.	Local Saika.	Panbira.
	1	2	3	4	5	6
Maund per acre ..	16.05	16.10	16.00	15.20	14.50	13.00
Per cent. ..	122.00	118.00	117.22	111.35	106.23	95.16

Grain.	Dharial.	Dhala Saika.	Kumari.	General mean.	Error.	Critical difference.
	7	8	9	10	11	12
Maund per acre ..	12.70	10.45	8.42	13.65	1.39	4.00
Per cent. ..	93.04	76.59	61.71	100.00	10.18	29.30

BERHAMPORE FARM (EARLY STRAINS).

5 varieties 5 times replicated—area of sub-plot—1/40th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of \bar{X} .
Blocks ..	4	56.35	14.08	..	..	..
Treatment ..	4	395.18	98.79	..	..	13.17*
Error ..	16	120.03	7.50	2.74	1.23	..
Total ..	24	571.56	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Local Salta.	Pukhl.	Jagal (local).	P. & S. (S).	D × L.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8
Maund per acre ..	15.30	12.62	11.95	7.35	4.20	10.28	1.23	3.60
Per cent. ..	148.86	122.79	116.27	71.51	40.86	100.00	12.00	35.89

KRISHNAGAR FARM.

4 varieties 7 times replicated—area of sub-plot—1/40th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Value of \bar{X} .
Blocks ..	6	17.01	2.83	..	..	..
Treatment ..	3	345.12	115.04	..	..	35.40*
Error ..	18	58.53	3.25	1.80	0.68	..
Total ..	27	420.66	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	Dharial.	Marich-beti (2).	Katak-tara.	Kele (local).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7
Maund per acre ..	34.57	28.46	26.32	25.68	28.76	0.68	2.02
Per cent. ..	119.95	99.04	91.59	89.46	100.00	2.36	7.02

APPENDIX I-B.

PRELIMINARY TEST OF EARLY FLOWERING AMAN PADDY STRAINS.

BOTANICAL SECTION, DACCA FARM (1939-40).

14 strains \times 10 (in randomised blocks).

Analysis of variance (weight of 100 plants in tolas).

Variance due to	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	9	4,842.58	538.06	..	..	0.68
Treatment ..	13	15,012.24	1,154.79	..	..	1.47*
Error ..	117	88,008.12	757.33	27.52	8.71	..
Total ..	139	108,462.94	..	..	..	..

*Not significant.

Summary of results.

	Nagra 41/14.	Jhingasaill.	Jeshobalam.	Chin- surah (72).	Gazla (Raj- shahit).	Nirbhoy (Dacca).	Boldar (Chin- surah).	C 22 \times R 22 (17).
	1	2	3	4	5	6	7	8
Weight of 100 plants (in tolas).	128.80	126.70	114.20	113.50	110.00	108.90	104.10	102.70
Weight per cent. ..	120.24	118.28	106.61	105.96	102.69	101.66	97.18	95.87

	Kartik- sinni (pure- line).	D \times I (34).	Kartik- sinni (culti- vators).	Kartik- sail (Dina- pur).	Kartik- sail (Dacca).	D \times I (36).	General mean.	Error.	Critical difference.
	9	10	11	12	13	14	15	16	17
Weight of 100 plants (in tolas).	102.20	101.20	101.10	98.10	94.80	93.40	107.12	8.71	24.38
Weight per cent.	95.41	94.47	94.38	91.58	88.50	87.19	100	8.13	22.76

Remarks.—Nagra and Jhingasaill are the two best yielders but they are not significantly superior to Jeshobalam, Chinsurah (72), Gazla and Nirbhoy. Karticksinni, Karticksail and the hybrids are low yielders.

**PRELIMINARY TEST OF SELECTED MEDIUM AND LATE FLOWERING AMAN
PADDY STRAINS.**

BOTANICAL SECTION, DACCA FARM (1939-40).

“Grains” (weight of 100 plants in tolas).

20 strains \times 10 (in randomised blocks).

Analysis of variance.

Variance due to --	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	9	7,175.52	797.28	..	..	2.10
Treatment ..	19	27,010.52	1,421.61	..	..	3.75*
Error ..	171	65,391.28	378.61	19.49	6.16	..
Total ..	199	99,580.32	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

	Latisall.	Latisall.	Bhog- dhan (Rajshahi).	Aman- dhan (Miscella- neous).	1353.	Bhasa- manik.
	1	2	3	4	5	6
Average yield per 100 plants (in tolas).	152.70	138.90	134.30	131.10	130.10	129.90
Weight per cent. ..	124.37	113.13	109.38	106.78	105.96	105.80

	D \times I (126).	Biroj (Mymen- singh).	Sindur- mukhi (Bankura).	1798.	Malati (Dacca).
	7	8	9	10	11
Average yield per 100 plants (in tolas).	129.20	126.10	126.10	125.20	123.60
Weight per cent. ..	105.23	102.70	102.70	101.97	100.67

	1314.	1351.	Tilakka- cheri.	Dudsar	D \times I (A).	Manikraj (Comilla).
	12	13	14	15	16	17
Average yield per 100 plants (in tolas).	122.70	117.90	116.20	115.30	112.90	112.90
Weight per cent. ..	99.93	98.03	94.64	93.91	91.95	91.95

	Chaplash (Comilla).	Indrasall.	Manik- kalma.	General mean.	Error.	Critical difference.
	18	19	20	21	22	23
Average yield per 100 plants (in tolas).	110.40	109.30	100.80	122.78	6.16	17.19
Weight per cent. ..	89.92	89.02	82.10	100	5.02	14.00

BENGAL *vs.* BLUE-STICK.

BOTANICAL SECTION, DACCA FARM (1939-40).

"Grains" (weight of 100 plants in tolas).

9 strains \times 10 (in randomised blocks).*Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	9	5,435.79	603.98	..	..	2.14
Treatment ..	8	64,034.40	8,004.30	..	..	18.33*
Error ..	72	20,340.71	282.51	16.81	5.32	..
Total ..	89	89,810.90	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

---	Dhepl.	Nagra 68/6.	Blue-stick.	Patnai (19).	Patnai (23).	Tarashi.
	1	2	3	4	5	6
Weight of 100 plants (in tolas) ..	153.00	152.40	142.70	138.50	134.50	133.40
Weight per cent. ..	120.82	120.35	112.69	109.37	106.21	105.35

—	Hatisail.	Rajasail.	Badkalam-kathi (65).	General mean.	Error.	Critical difference.
	7	8	9	10	11	12
Weight of 100 plants (in tolas) ..	117.10	104.30	63.80	126.63	5.32	14.98
Weight per cent. ..	92.47	82.37	50.38	100	4.20	11.83

Remarks.—Blue-stick, though yields less than Dhepl and Nagra 68/6 is not significantly a worse yielder than either nor is it significantly better than the two Patnai strains and Tarashi, but is decidedly superior to the rest.

PRELIMINARY TEST OF HYBRID STRAINS.

BOTANICAL SECTION, DAOCA FARM (1939-40).

"Grains" (weights of 100 plants in tolas).

14 strains \times 10 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	9	11,951.87	1,327.99	..	..	1.86
Treatment ..	13	51,027.04	3,925.16	..	..	5.49*
Error ..	117	83,603.03	714.57	26.73	8.46	..
Total ..	139	146,581.94	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Latisail.	Jhinga \times Lati- sail (10/400).	K. G. \times Dad (12/21- G.).	Indra- sail.	K. G. \times Dad (12/60 R.).	K. G. \times Dad (12/64- G.).	Dad- khand.	Jhinga \times Lati- sail (10/83).
	1	2	3	4	5	6	7	8
Weight of 100 plants (in tolas) ..	136.50	127.90	121.50	116.00	112.00	110.60	105.60	95.80
Weight per cent. ..	133.20	124.80	118.56	113.78	109.29	107.92	103.04	93.48

—	Jhinga \times Lati- sail (8/301).	K. G. \times Dad (14/24- R.).	King George.	Jhinga \times Lati- sail (8'1).	Jhinga- sail.	K. G. \times Dad (14/35- G.).	General mean.	Error.	Critical differ- ence.
	9	10	11	12	13	14	15	16	17
Weight of 100 plants (in tolas) ..	95.00	94.70	86.40	85.80	82.50	64.30	102.48	8.46	23.59
Weight per cent. ...	92.70	92.41	84.31	83.24	80.50	62.75	100	8.26	23.02

Remarks.—Of the Latisail hybrids only Jhingasail \times Latisail (10/400) compares favourably with Latisail. Of the Dadkhandi hybrids only K. G. \times Dad (12/21G.) is superior to Dadkhandi.

FOREIGN *vs.* LATISAIL.

BOTANICAL SECTION, DACCA FARM (1939-40).

"Grains" (weight of 100 plants in tolas).

12 strains \times 10 (in randomised blocks).*Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	9	12,411.03	1,379.00	..	..	2.89
Treatment ..	11	37,878.40	3,443.49	..	..	7.22*
Error ..	99	47,193.77	476.70	21.83	6.91	..
Total ..	119	97,483.20	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Latisall.	Ramay.	Democrara.	British Quiana (79).	Macanbinan.	Eloneton.	Ramcajira.
	1	2	3	4	5	6	7
Weight of 100 plants (in tolas) ..	144.90	134.10	130.20	128.30	127.60	117.30	114.70
Weight per cent. ..	124.70	115.40	112.05	110.41	109.81	100.95	98.71

—	Mauca-sar.	Blue-stick.	British Quiana (75).	Mantica-non.	Qulana-ganj.	General mean.	Error.	Critical difference.
	8	9	10	11	12	13	14	15
Weight of 100 plants (in tolas) ..	111.50	110.90	102.80	93.80	78.30	116.20	6.91	19.37
Weight per cent. ..	95.96	95.44	88.50	80.72	67.38	100	5.95	16.67

Remarks.—Latisall, though the heaviest yielder, is not significantly superior to Ramay, Democrara, British Quiana (79) and Macanbinan.

PRELIMINARY TEST OF SELECTED HYBRID STRAINS.

METHOD—QUASI-FACTORIAL EXPERIMENT (PARTIALLY BALANCED INCOMPLETE RANDOMISED BLOCKS).

BOTANICAL SECTION, DACCA FARM (1939-40).

“Grains” (weight of 100 plants in tolas).

Number of strains	..	..	81
Number of blocks	..	..	36
Number of groups	..	..	.

(i) Rows.

(ii) Columns.

(iii) Orthogonal square (1).

(iv) Orthogonal square (2).

Analysis of variance.

Variance due to—			Degree of freedom.	Sums of squares.	Variance.	Mahalanobis' X.
Blocks	..	..	35	23,557.47	673.07	3.03
Varieties	..	..	80	54,226.21	677.83	3.05*
Error		..	208	46,168.90	221.97	..
Total		..	323	123,952.58	..	..

*Significant at 1 per cent. level.

Critical difference for 1st pair of associates .. 12.68

Critical difference for 2nd pair of associates .. 12.78

Summary of results.

Adjusted yields in tolas (arranged according to yield) per 100 plants.

1 (77)	2 (48)	3 (63)	4 (67)	5 (3)	6 (53)	7 (66)	8 (25)		
114.7315	110.5185	106.2903	105.5714	105.2685	104.7963	101.2870	101.2778		
9 (30)	10 (55)	11 (35)	12 (19)	13 (45)	14 (44)	15 (58)	16 (52)	17 (61)	18 (79)
99.0750	99.3722	99.0741	98.4907	97.3148	96.3611	95.2777	94.9537	94.5741	93.4259
19 (62)	20 (8)	21 (50)	22 (27)	23 (20)	24 (49)	25 (59)	26 (71)	27 (2)	28 (16)
92.8518	92.4907	91.9029	91.4259	91.3706	91.2685	90.9537	90.7870	89.9815	89.6852
29 (1)	30 (4)	31 (15)	32 (21)	33 (78)	34 (33)	35 (26)	36 (60)	37 (11)	38 (56)
89.3981	88.7870	88.2129	88.1018	87.9166	87.2037	86.7222	86.5463	86.0278	85.8426
39 (70)	40 (46)	41 (73)	42 (43)	43 (6)	44 (75)	45 (74)	46 (5)	47 (14)	48 (81)
85.6111	85.5001	85.3796	85.0278	84.6204	84.3981	84.3518	84.2407	83.2315	83.1111
49 (47)	50 (7)	51 (32)	52 (29)	53 (18)	54 (72)	55 (13)	56 (22)	57 (54)	58 (24)
82.5185	81.9907	81.7685	81.5648	80.4537	79.9259	79.6852	77.9444	76.7129	76.6481
59 (63)	60 (51)	61 (64)	62 (31)	63 (76)	64 (57)	65 (9)	66 (23)	67 (10)	68 (80)
76.0463	75.4906	74.7963	74.5741	74.3055	74.2407	73.9444	70.7315	69.4906	69.4352
69 (38)	70 (69)	71 (37)	72 (65)	73 (12)	74 (40)	75 (17)	76 (36)	77 (28)	78 (34)
68.6852	67.3611	66.6018	66.0000	65.4352	64.6018	62.1769	59.5000	59.2224	56.1389
79 (42)	80 (41)	81 (39)	General mean = 83.5864						
53.3518	49.0852	48.0926							

Remarks.—1-6 very good yielders.

7-29 good yielders.

30-58 average yielders.

59-74 poor yielders.

75-81 very poor yielders.

N.B.—The figure in serial order shows the position of the strains in order of merit (yield). The figure in parenthesis shows the number of the strains.

WEEDING *vs.* NO WEEDING.

BOTANICAL SECTION, DACCA FARM (1939-40).

“Grains” (weight of 100 plants in tolas).

4 strains \times 8 (in randomised blocks)—Variety—Tilakkachari.*Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	7	1,984.17	283.45	..	..	4.57
Treatment ..	3	3,545.37	1,181.79	..	..	19.04*
Error ..	21	1,303.33	62.06	7.88	2.79	..
Total ..	31	6,832.87	..	..	..	..

* Significant at 1 per cent. level.

Summary of results.

—	One weeding.	Three weedings.	Two weedings.	No weeding.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7
Weight of 100 plants (in tolas).	119.00	117.00	115.00	93.00	111.00	2.79	8.19
Weight per cent. ..	107.21	105.41	103.60	83.78	100.00	2.51	7.38

Remarks.—Weeding once only increases the yield substantially but weeding more than once does not improve the yield any further.

WEEDING *vs.* NO WEEDING.

BOTANICAL SECTION, DACCA FARM (1939-40).

*Straw yield.**Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	7	8,771.87	1,253.12	..	..	3.78
Treatment ..	3	7,459.37	2,486.46	..	..	7.50*
Error ..	21	6,965.63	331.70	18.21	6.44	..
Total ..	31	23,196.87	..	..	..	..

* Significant at 1 per cent. level.

Summary of results.

—	One weeding.	Two weedings.	Three weedings.	No weeding.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7
Weight of 100 plants (in tolas).	163.00	156.00	135.00	125.00	145.00	6.44	10.03
Weight per cent. . .	112.41	107.59	93.10	86.21	100	4.44	13.12

Remarks.—Weeding once only increases straw yield, but weeding thrice has lowered the yield.

LARVICIDE DUSTING EXPERIMENT OF INDRASAIL AMAN PADDY.

BOTANICAL SECTION, DAUCA FARM (1939-40).

“Full grains” (Average weight of 100 plants in tolas).

6 treatments × 8 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	7	895.15	127.88	..	..	1.18
Treatment ..	5	4,573.61	914.72	..	..	8.44*
Error ..	35	3,795.22	108.43	10.41	3.68	..
Total ..	47	9,263.98	..	..	..	..

*Significant at 1 per cent. level.

Summary of results (weight of full grains).

—	Copper cyanide (evening).	Copper cyanide (morning).	Control (no dusting).	Soft stone powder (morning).	Paris green (morning).	Paris green (evening).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Weight of 100 plants (in tolas).	103.38	101.88	101.63	98.50	81.38	80.38	94.52	3.68	10.52
Weight per cent. . .	109.37	107.79	107.52	104.21	86.10	85.04	100	3.80	11.13

Remarks.—Paris green (applied morning or evening) is detrimental to the yield. The other treatments are not significantly different.

LARVICIDE DUSTING EXPERIMENT ON INDRASAIL AMAN PADDY.

BOTANICAL SECTION, DACCA FARM (1939-40).

"Straw" (average weight of 100 plants in tolas).

6 treatments \times 8 (in randomised blocks).*Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	7	13,150.00	1,878.57	..	..	3.20
Treatment ..	5	1,305.17	261.03	..	..	0.44*
Error ..	35	20,534.50	586.70	24.22	8.56	..
Total ..	47	34,989.67	..	..	..	..

*Not significant.

Summary of results (straw yield).

	Copper cyanide (evening).	Soft stone powder (morning).	Control (no dusting).	Paris green (evening).	Copper cyanide (morning).	Paris green (morning).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Weight of 100 plants (in tolas).	153.63	149.50	148.13	145.38	140.38	138.50	145.92	8.56	24.48
Weight per cent. ..	105.28	102.45	101.51	99.63	96.20	94.92	100	5.87	16.76

Remarks.—Effects of the various larvicides are not significantly different on the straw yields.

LARVICIDE DUSTING EXPERIMENT ON INDRASAIL AMAN PADDY.

BOTANICAL SECTION, DACCA FARM (1939-40).

“Husk” (average weight of 100 plants in tolas).

6 treatment \times 8 (in randomised blocks).*Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	7	53.64	7.66	..	..	1.22
Treatment ..	5	152.67	30.54	..	..	4.87*
Error ..	35	219.48	6.27	2.50	0.88	..
Total ..	47	425.81	..	..	..	..

*Significant at 1 per cent. level.

Summary of results (husk yield).

—	Paris green (evening).	Paris green (morning).	Copper cyanide (evening).	Control (no-dusting).	Copper cyanide (morning).	Soft stone powder (morning).	General mean.	Error.	Critical difference.
Weight of 100 plants (in tolas).	13.75	11.88	9.63	9.38	9.25	8.75	10.44	0.88	2.51
Weight per cent. ..	131.71	118.70	92.24	89.85	88.60	83.81	100	8.43	24.04

Remarks.—Application of Paris green significantly increases the husk. The other treatments are not significantly different.

COMPLEX CULTURAL EXPERIMENTS, 1938-39.

Experiment No. 1.

Three-factor complex experiment on winter rice (Indrasail). Factors—five dates of planting, six ages of seedling and three different numbers of seedling per hole.

Lay-out.—Split-plot in five randomised blocks.

Results.

(1) *Date of planting.*—Analyses for both grain and straw show progressive deterioration of yield with the delay of transplantation.

(2) *Age of seedling.*—Analyses in both the cases show that age of the seedling has an effect on the yield. In the case of grain, seedlings aged 7 weeks gave the heaviest yield, whereas in the case of straw seedlings aged 3 weeks gave the maximum amount. Last year, however, no such distinction was observed.

(3) *Seedling number.*—In the case of grain the number of seedlings per hole has no effect on the yield. In the case of straw, however, the local method gave the heaviest yield.

(4) *Interactions.*—(i) *Date of planting* \times *Age of seedling.*—The effect of date of planting \times age of seedling is significant for both grain and straw. The earliest and the second dates of planting for seedlings aged 7 weeks gave the heaviest yield in the case of grain and heaviest yield of straw was given in the first case.

Last year, the interaction was insignificant for both grain and straw.

(ii) *Date of planting* \times *Number of seedling.*—This interaction is insignificant in both the cases. Last year this was highly significant.

(iii) *Number of seedling* \times *Date of planting* \times *Age of seedling.*—This is insignificant for grain but highly significant for straw.

Experiment No. 2.

Complex cultural experiment on rice.

Factors—six dates of planting, three different spacings and three varieties (Latisail, Indrasail and Tilakkachari).

Lay-out.—Split-plot in three randomised blocks.

Results.

As observed last year, the analyses for grain and straw yields for this year as well show that the primary effects of date of planting and of spacing on the yield in both the cases is highly significant and that of the varieties is not significant at all. For grain the second date of planting gave the maximum yield but for straw it was the earliest date which gave the heaviest yield.

Considering the spacings, it may be definitely said both for grain and straw that 6" is the best, 9" comes next and 12" is the "poorest." This agrees with the results of last year.

Interactions.—As observed last year, the interaction between spacing and date of planting, this year, is significant for grain only. Here it is found that the second date of planting gave the heaviest yield for 6" and 9" spacings, whereas the earliest date gave the maximum in case of 12" spacing. This result does not agree with that of last year.

All the other interactions are insignificant.

Experiment No. 3.

This experiment is designed to study the effect of spacings and number of seedlings per hole on two strains of winter rice having different period of maturity.

The effect was studied with respect to the following characters:—

- (1) Yield of grain, (2) yield of straw, (3) number of fertile tillers per plant, (4) length of inflorescence, (5) number of spikelets per tiller, (6) ratio of full grains to unfilled grains, (7) size and shape of grains, (8) height of the plant and (9) extent of exertion.

Lay-out.—Split-plot in four randomised blocks.

The analyses bring out the following significant effects:—

(i) *Yield of grain.*—The yield increases as spacing is increased. 15" spacing gives heaviest yield. Tilakkachari gives a heavier yield of grain.

(ii) *Yield of straw.*—Straw yield increases as spacing is increased. 15" spacing gives the maximum yield. Local method for number of seedling in combination with 15" spacing gives maximum yield of straw. Tilakkachari gives a heavier yield of straw.

(iii) *Number of fertile tillers.*—Local method for the number of seedlings per hole gives a better result. 15" spacing is better than the other spacings and in combination of local method of sowing gives the best result. Latisail has a larger number of fertile tillers than Tilakkachari.

(iv) *Length of inflorescence.*—9", 12" and 15" spacings give a longer inflorescence than 6" spacing. Single seedling sowing with Tilakkachari gives the longest inflorescence.

(v) *Number of spikelets.*—Single seedling sowing improves the number of spikelets. The same is observed for 15" spacing. Tilakkachari has a larger number of spikelets than Latisail.

(vi) *Ratio of full spikelets to unfilled spikelets.*—The ratio is highest in case of single seedling and Latisail variety.

(vii) *Size and shape.*—Tilakkachari has larger grains.

(viii) *Height of plant.*—6" and 12" spacings give taller plants. Plants of Tilakkachari species are taller.

(ix) *Extent of exertion.*—Latisail is decidedly superior to Tilakkachari.

Complex Cultural Experiment No. 1 (1939-40).

Lay-out.—Split-plot. Replications—five.

Three factors—(i) five dates of planting, (ii) six ages of seedling and (iii) three numbers of seedlings.

1. *Date of planting.*—Progressive deterioration in straw yield with delay in date of planting, but this is not marked in case of grain where August plantings gave the maximum yield.

2. *Age of seedling.*—Does not give significant difference.

3. *Seedling numbers.*—Significant difference. Yield increases with increase in number of seedlings.

4. *Interactions.*—

(i) Date \times Age—Significant for grain only.

(ii) Date \times Seedling number—Significant for grain only.

(iii) Number \times Age—Significant for straw only.

(iv) Date \times Age \times Seedling number—Significant for grain only.

In the analysis of variance for grain of the yield of plants of 3 plots in Block 1, and one plot in Block 3 were badly damaged, the adjusted values of which were obtained by the missing plot technique.

Complex Cultural Experiment No. 2 (1939-40).

Study of the effect of varying dates of planting and spacing on three strains of winter rice Latisail, Indrasail and Tilakkachari.

The primary effect of date of planting on the yield, both for grain and straw, is highly significant. The same for spacing presents a similar feature, but in case of varieties the straw yield only is significant. The second date of planting gave virtually the maximum yield for grain, though it is not statistically better than the first date of planting. In case of straw, however, it is the first date which gave the maximum yield. Yields of later plantings in both the cases fall off very rapidly.

Considering the three different spacings it may definitely be said both for grain and straw that 6" is the best, 9" comes next and 12" gives the poorest yield.

Of the first order interactions, that due to spacing \times date of planting is significant at 1 per cent. level of probability in the case of yield of grain, whereas in the case of straw it is not all significant. Excepting the first date of planting, for grains 6" gives the heaviest yield, 9" comes next and then comes 12". For the first date, however, exactly the reverse holds good.

No other interactions show any significant results.

TEST OF TRANSPLANTED AMAN STRAINS.

DACCA FARM (1939-40).

"Grains" (area of unit plot—1/60th of an acre).

9 strains \times 5 (in randomised blocks).

Analysis of variance.

Variance due to—			Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X^2
Blocks	..	..	4	35.87	8.97	..	..	1.73
Treatment	..	..	8	185.31	23.16	..	..	4.46*
Error	..	..	32	166.13	5.19	2.28	1.02	..
Total	..	..	44	387.31	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—			Nagra.	Latisail.	Malati.	Indrasail.	Bhasa-manik.	Kartick-sini.
			1	2	3	4	5	6
Grains in maunds per acre	..	..	25.50	23.55	23.55	22.20	21.45	21.00
Grains per cent.	..	..	120.22	111.03	111.03	104.07	101.13	99.01

—			D \times J (13).	Dudsar.	Ch. \times Raj (22).	General mean.	Error.	Critical difference.
			7	8	9	10	11	12
Grains in maunds per acre	..	..	19.95	19.50	14.25	21.21	1.53	4.40
Grains per cent.	..	..	94.06	92.00	67.18	100	7.21	20.74

Remarks.—Nagra gives the maximum yield but is not significantly a better yielder than Latisail. and Malati. Hybrid Ch. \times Raj (22) is the lowest yielder.

TEST OF AMAN PADDY STRAINS.

DACCA FARM (1939-40).

STRAW YIELD.

Analysis of variance.

Variance due to—			Degree of freedom.	Sum of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' χ .
Blocks	..	..	4	610.13	152.53	..	..	2.71
Treatment	..	..	8	1,987.60	245.95	..	..	1.78*
Error	..	..	32	2,649.07	82.78	9.10	4.06	..
Total	..	..	44	5,226.80	..	..	..	..

*Not significant.

Summary of results.

—		Malati.	Bhasa-manik.	Indrasall.	Kartick-sinni.	Latisall.	Nagra.
		1	2	3	4	5	6
Weight in maunds per acre	..	100.50	87.00	84.00	84.00	81.00	78.00
Weight per cent.	..	125.00	108.21	104.48	104.48	100.74	97.01

—		Dudsar.	D × I (13).	Chin × Raj (22).	General mean.	Error.	Critical difference.
		7	8	9	10	11	12
Weight in maunds per acre	..	75.00	69.00	64.50	80.40	6.09	17.45
Weight per cent.	..	94.03	85.83	80.22	100	7.57	21.70

Remarks.—Malati gives the maximum straw and the two hybrids the least.

TEST OF LONG-STRIP PADDIES.

BARISAL FARM (1939-40).

*"Grains" (area of unit plot—1/40th of an acre).**5 strains × 5 (in randomised blocks).**Analysis of variance.*

Variance due to—			Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks	..	..	4	38.07	9.52	..	..	1.34
Treatment	..	..	4	40.21	10.05	..	..	1.41*
Error	..	..	16	114.10	7.13	2.67	1.19	..
Total	..	..	24	192.38	..	..	..	..

*Not significant.

Summary of results.

	Chingri-ghusl No. 5.	Cultivators' Khiraj-jal.	Cultivators' Chingri-ghusl.	Khiraj-jal No. 8.	Gosaba Patnal (23).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8
Weight in maunds per acre ..	25.53	24.00	24.50	24.15	21.81	24.18	1.19	3.57
Weight per cent. ..	105.58	102.08	101.32	99.88	90.20	100	4.92	14.76

Remarks.—There is nothing to choose between the first 4 varieties, but Gosaba Patnal (23) appears to be a lower yielder.

PRELIMINARY TEST OF SELECTED AMAN PADDY STRAINS.

BARISAL FARM (1939-40).

*"Grains" (weight of 100 plants in tolas).**24 strains × 10 (in randomised blocks).**Analysis of variance.*

Variance due to—			Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks	..	..	9	6,771.95	752.44	..	..	3.20
Treatment	..	..	23	11,782.79	512.30	..	..	2.18*
Error	..	..	207	48,028.03	234.92	15.33	4.85	..
Total	..	..	239	67,182.77	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Cultiva- tors' Chingri- ghusl. 1	Bansful No. 3. 2	Chingri- ghusl No. 5. 3	Manar 56 of N. C. 4	Cultiva- tors' Khiraljall. 5	Bansful No. 7. 6
Weight of 100 plants (in tolas) ..	172.33	166.95	165.35	165.15	162.70	162.55
Weight per cent. ..	112.36	108.85	107.81	107.68	106.08	105.99

—	Chingri- ghusl No. 8. 7	Patnai No. 195. 8	Chingri- ghusl No. 12. 9	Bansful No. 5. 10	Khiraljall No. 8. 11	Patnai No. 1. 12	Cultiva- tors' Bansful. 13
Weight of 100 plants (in tolas) ..	161.00	159.95	156.35	155.73	155.40	153.40	152.30
Weight per cent. ..	104.97	104.29	101.94	101.54	101.32	100.02	99.30

—	Patnai No. 7. 14	Bansful No. 1. 15	Sarisha- kani (76) of B. P. 16	Bansful No. 52. 17	Khiraljall No. 1. 18	Khiraljall No. 9. 19	Hamai (197). 20
Weight of 100 plants (in tolas) ..	150.55	150.05	149.78	148.28	145.95	145.15	143.55
Weight per cent. ..	98.16	97.84	97.66	96.68	95.16	96.64	93.60

—	Khiraljall No. 2. 21	Khiraljall No. 51. 22	Indrasail (Dacca). 23	Patnai No. 23. 24	General mean. 25	Error. 26	Critical difference. 27
Weight of 100 plants (in tolas) ..	141.75	141.63	139.13	135.85	153.37	4.85	13.52
Weight per cent. ..	92.42	92.35	90.72	88.58	100	3.16	8.82

TEST OF AMAN PADDY STRAINS.

MYMENSINGH FARM (1939-40).

“Grains” (area of unit plot—1/50th of an acre).

4 strains × 8 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks	7	43.87	6.27	..	..	3.22
Treatment	3	38.12	12.71	..	..	6.52*
Error	21	40.88	1.95	1.40	0.49	..
Total ..	31	122.87	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Latisall.	Dudsar.	Bhol (local).	Bhasanauik.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7
Weight in maunds per acre ..	19.85	17.81	17.19	16.10	17.74	0.61	1.46
Weight per cent. ..	111.89	100.39	96.90	90.76	100	3.44	8.23

Remarks.—Latisall gives the maximum yield, Dudsar comes next followed by the local variety which though a better yielder than Bhasanauik and a worse yielder than Dudsar is not significantly different from either.

TEST OF AMAN PADDY STRAINS.

COMILLA FARM (1939-40).

“Grains” (area of unit plot—1/30th of an acre).

5 strains × 6 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	5	227.74	45.54	..	..	3.10
Treatment ..	4	207.46	51.87	..	..	3.53*
Error ..	20	293.51	14.68	3.83	1.56	..
Total ..	29	728.71	..	..	..	..

*Significant at 5 per cent. level.

Summary of results.

	Tilak- kacheri.	Indra- sali.	Bhasa- manik.	Latisali.	Chap- plash.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8
Weight in maunds per acre ..	29.73	27.02	27.32	25.22	24.06	26.79	1.17	3.45
Weight per cent. ..	110.94	103.10	101.98	94.01	89.81	100	4.37	12.88

Remarks. Tilakkacheri is the heaviest yielder but is not significantly superior to Indrasali and Bhasmanik. Chaplash gives the least yield but is not significantly worse than Bhasmanik and Latisali.

TEST OF RECOMMENDED EARLY AMAN STRAINS.

RAJSHAHI FARM (1939-40).

“Grains” (area of unit plot = 1/40th of an acre).

4 strains x 5 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahala- nobis'X.
Blocks ..	4	20.65	5.17	..	..	0.90
Treatment ..	3	984.90	328.30	..	..	57.20*
Error ..	12	68.82	5.74	2.39	1.07	..
Total ..	19	1,074.40	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

	Boldar.	C22 x R22.	Batraj.	Badka- lamkathi (65).	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7
Weight in maunds per acre ..	23.37	22.65	9.60	8.42	16.01	1.07	3.30
Weight per cent. ..	145.07	141.47	59.96	52.59	100.00	6.68	20.61

Remarks.—Boldar and C22 x R22 are far superior to Batraj and Badkalamkathi (65).

TEST OF EARLY AMAN PADDY STRAINS.

RAJSHAHI FARM (1939-40).

STRAW YIELD.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	4	5.00	1.25	..	..	0.17
Treatment ..	3	1,081.80	360.60	..	..	47.95*
Error ..	12	90.20	7.52	2.74	1.22	..
Total ..	19	1,177.00	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	C22 × R22.	Boldar.	Balka-laukathi (65).	Batraj.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7
Weight in maunds per acre ..	31.00	28.60	15.60	14.80	22.50	1.22	3.76
Weight per cent. ..	137.78	127.11	69.33	65.78	100	5.42	16.78

Remarks.—C22 × R22 and Boldar gave a far heavier yield of straw than the other two varieties.

TEST OF LATE AMAN PADDY STRAINS.

RAJSHAHI FARM (1939-40).

“Grains” (area of unit plot—1/50th of an acre).

6 strains × 6 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	5	209.27	59.85	..	..	21.76
Treatment ..	5	269.51	53.90	..	..	90.60*
Error ..	25	68.67	2.75	1.66	0.68	..
Total ..	35	637.45	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Dudsar.	Bhasa- manik.	Indra- sail.	D × I.	Jhinga- sail.	Elai.	General mean.	Error.	Critical differ- ence.
	1	2	3	4	5	6	7	8	9
Weight in maunds per acre ..	27.20	26.70	23.40	21.55	21.05	17.25	22.85	0.85	2.48
Weight per cent. ..	119.04	116.85	102.41	94.31	92.12	75.49	100	3.72	10.85

Remarks.—Dudsar and Bhasamanik are significantly better than the other varieties. Elai is definitely the worst yielder.

TEST OF LATE AMAN PADDY STRAINS.

RAJSHAHI FARM (1939-40).

STRAW YIELD.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Varianc.	Standard deviation.	Standard error.	Mahalanobis' N.
Blocks ..	5	536.48	107.30	..	..	26.11
Treatment ..	5	211.81	42.36	..	..	10.31*
Error ..	25	102.60	4.11	2.03	0.83	..
Total ..	35	850.98	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Bhasa- manik.	Dudsar.	Indra- sail.	D × I.	Elai.	Jhinga- sail.	General mean.	Error.	Critical differ- ence.
	1	2	3	4	5	6	7	8	9
Weight in maunds per acre ..	32.08	31.88	31.04	27.08	26.45	24.16	28.77	1.04	3.08
Weight per cent. ..	111.51	110.81	107.89	94.13	91.94	83.98	100	3.61	10.53

Remarks.—Bhasamanik, Dudsar and Indrasail yielded more straw than the other varieties.

UNIFORMITY TEST.

MAYNAGURI FARM (1939-40)—VARIETY—DUDSAR.

“Grains” (area of unit plot—1/48th of an acre).

7 positions \times 6 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	5	5.15	1.03	..	..	2.71
Treatment ..	6	3.21	0.54	..	..	1.42*
Error ..	30	11.43	0.38	0.62	0.25	..
Total ..	41	19.79	..	..	..	..

*Not significant.

Summary of results.

—	P II.	P III.	P IV.	P I.	P VI.
	1	2	3	4	5
Weight in maunds per acre ..	26.20	26.20	25.80	25.50	25.50
Weight per cent. ..	101.87	101.87	100.31	99.14	99.14

—	P V.	P VII.	General mean.	Error.	Critical difference.
	6	7	8	9	10
Weight in maunds per acre ..	25.40	25.40	25.72	0.80	0.87
Weight per cent. ..	98.76	98.76	100	1.17	3.38

Remarks.—There is nothing to choose between the positions.

UNIFORMITY TEST—VARIETY—DUDSAR.

MAYNAGURI FARM (1939-40).

*"Straw" (area of unit plot—1/48th of an acre).**7 positions × 6 (in randomised blocks).**Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	5	13.83	2.77	..	..	1.81
Treatment ..	6	20.20	3.37	..	..	2.20*
Error ..	30	45.84	1.53	1.24	0.51	..
Total ..	41	79.87	..	..	..	..

*Not significant.

Summary of results.

—	P II.	P III.	P IV.	P V.	P VI.
	1	2	3	4	5
Weight in maunds per acre ..	48.00	48.00	48.00	46.80	46.00
Weight per cent. ..	101.95	101.95	101.95	99.41	98.98

—	P VII.	P. I.	General mean.	Error.	Critical difference.
	6	7	8	9	10
Weight in maunds per acre ..	46.30	45.90	47.08	0.60	1.73
Weight per cent. ..	98.34	97.49	100	1.27	3.67

TEST OF AMAN PADDY STRAINS.

DINAJPUR FARM (1939-40).

"Grains" (area of unit plot—1/40th of an area).

8 strains \times 5 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	4	160.02	40.00	..	..	3.73
Treatment ..	7	473.59	67.66	..	..	6.31*
Error ..	28	300.38	10.73	3.28	1.46	..
Total ..	39	933.99	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Bhasamanik.	Nagra.	Indrasali.	Dudsar.	Latisali.
	1	2	3	4	5
Weight in maunds per acre ..	25.80	24.30	22.70	21.80	19.60
Weight per cent. ..	125.00	117.73	109.98	105.62	94.96

—	Local.	Jhinga-sali.	D \times I (34).	General mean.	Error.	Critical difference.
	6	7	8	9	10	11
Weight in maunds per acre ..	19.10	16.50	15.30	20.64	1.46	4.25
Weight per cent. ..	92.54	79.94	74.13	100	7.07	20.59

Remarks.—Bhasamanik gave the heaviest yield but is not significantly superior to Nagra, Indrasali, and Dudsar. Latisali was not satisfactory. The local variety is inferior to Bhasamanik and Nagra only.

TEST OF AMAN PADDY STRAINS.

DINAJPUR FARM (1939-40).

STRAW YIELD.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	4	789.90	197.48	..	..	14.33
Treatment ..	7	643.70	91.96	..	..	6.68*
Error ..	28	384.30	13.73	3.70	1.65	..
Total ..	39	1,817.90	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

	Indrasail.	Nagra.	Bhasamanik.	Dudsar.	Local.	Jhinga-sail.
	1	2	3	4	5	6
Weight in maunds per acre ..	29.80	28.30	28.10	22.20	22.00	21.80
Weight per cent. ..	125.21	118.91	118.07	93.28	92.44	91.60

	Latisail.	D × I (34).	General mean.	Error.	Critical difference.
	7	8	9	10	11
Weight in maunds per acre ..	19.20	19.00	23.80	1.66	4.79
Weight per cent. ..	80.67	79.83	100	6.97	20.13

Remarks.—Indrasail, Nagra and Bhasamanik gave the heaviest yield.

TEST OF AMAN PADDY STRAINS.

BOGRA FARM (1939-40).

"Grain" area of unit plot—1/60th of an acre).

(6 strains \times 6 (in randomised blocks).*Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	5	226.89	45.38	..	..	12.01
Treatment ..	5	46.10	9.22	..	..	2.44*
Error ..	25	94.52	3.78	1.94	0.79	..
Total ..	35	367.51	..	..	..	..

*Not significant.

Summary of results.

—	Latisall.	Jhingasall.	Bhasamank.	Indrasall (Departmental).	Indrasall (local).	Dudsar.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Weight in maunds per acre.	31.50	31.35	28.74	28.27	25.46	23.08	29.22	1.19	3.47
Weight per cent.	107.80	107.29	98.36	96.75	87.13	78.99	100	4.07	11.86

Remarks.—Latisall and Jhingasall are better yielders than the rest, of which Dudsar gives the least yield.

TEST OF EARLY AMAN PADDY STRAINS.

RANGPUR FARM (1939-40).

"Grains" (area of unit plot—1/30th of an acre).

6 strains \times 5 (in randomised blocks).*Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	4	137.95	34.59	..	..	2.32
Treatment ..	5	242.67	48.53	..	..	3.27*
Error ..	20	297.22	14.86	3.85	1.72	..
Total ..	29	677.84	..	..	..	..

*Significant at 5 per cent. level.

Summary of results.

	Lati-sail.	Bhasa-manik.	Indra-sail.	Jhingasaill.	Jesoa.	Dudsar.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Weight in maunds per acre.	21.00	19.80	18.90	18.75	16.40	14.25	18.27	1.29	3.80
Weight per cent.	114.94	108.37	103.45	102.63	89.76	78.00	100	7.06	20.80

Remarks.—Latisail gives virtually the maximum yield but is not significantly superior to Bhasamanik, Indrasail or Jhingasail. Dudsar is decidedly the poorest yielder.

TEST OF EARLY AMAN PADDY STRAINS.

RANGPUR FARM (1939-40).

STRAW YIELD.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	4	206.34	51.59	..	..	0.46
Treatment ..	5	8,330.76	1,666.13	..	..	14.95*
Error ..	20	2,229.66	111.48	10.56	4.71	..
Total ..	29	10,766.67	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

	Bhasa-manik.	Jesoa.	Lati-sail.	Indra-sail.	Dudsar.	Jhingasaill.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Weight in maunds per acre ..	64.65	43.05	39.15	34.05	28.20	27.90	39.51	3.54	10.44
Weight per cent...	163.63	108.96	99.09	86.18	71.37	70.62	100	8.96	26.42

Remarks.—Bhasamanik is decidedly the heaviest yielder. Dudsar and Jhingasail give the least yield.

TEST OF AMAN PADDY STRAINS.

MALDA FARM (1939-40).

*"Grains" (area of unit plot—1/60th of an acre).**6 strains × 3 (in randomised blocks).**Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	2	7.63	3.82	..	..	4.90
Treatment ..	5	204.70	40.94	..	..	62.49*
Error ..	10	7.78	0.78	0.88	0.51	..
Total ..	17	220.11	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Indra-sail.	Bhasa-manik.	Lati-sail.	Dudsar.	Batraj.	Chengul.	General mean.	Error.	Critical difference.
	1	2	3	4	5	6	7	8	9
Weight in maunds per acre ..	41.75	40.13	36.63	35.25	29.51	28.00	35.21	0.77	2.43
Weight per cent. ..	118.57	113.97	104.03	100.11	83.81	79.52	100	2.19	6.90

Remarks.—Indrasail and Bhasamanik are the two heaviest yielders, next come Latisail and Dudsar whilst Batraj and Chengul are decidedly lower yielders.

TEST OF AMAN PADDY STRAINS.

MALDA FARM (1939-40).

STRAW YIELD.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	2	4.33	2.17	..	..	1.07
Treatment ..	5	133.33	26.67	..	..	13.14*
Error ..	10	20.34	2.03	1.42	0.82	..
Total ..	17	158.00	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Indra-sail.	Bhasa-manik.	Chengul.	Lati-sail.	Dudsar.	Batraj.	General mean.	Error.	Critical difference.
—	1	2	3	4	5	6	7	8	9
Weight in maunds per acre ..	37.50	34.01	32.00	31.01	30.50	24.00	31.50	1.23	3.87
Weight per cent. ..	119.05	107.97	101.59	98.44	96.83	76.19	100	3.90	12.29

Remarks—Indrasail gave the heaviest yield but was not significantly better than Bhasamanik. Batraj gave the minimum yield. There is nothing to choose among the other varieties.

TEST OF AMAN PADDY STRAINS.

BURDWAN FARM (1939-40).

"Grains" (area of unit plot—1/40th of an acre).

8 strains \times 6 (in randomised blocks).

Analysis of variance.

Variance due to—	Degree of freedom.	Sum of squares.	Varianc.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	5	334.60	66.92	..	..	6.43
Treatment ..	7	372.14	53.16	..	..	5.11*
Error ..	35	363.98	10.40	3.22	1.31	..
Total ..	47	1,070.72	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

	Latisall.	Patnai (23).	Jatakalma (local).	Nagra.	Dudkalma (local).
	1	2	3	4	5
Weight in maunds per acre ..	32.64	30.75	30.37	28.58	26.50
Weight per cent. ..	116.74	109.98	108.62	102.22	94.78

	Dudsar.	Jhingasall.	Bhasa-manik.	General mean.	Error.	Critical difference.
	6	7	8	9	10	11
Weight in maunds per acre ..	25.25	25.00	24.83	27.96	1.31	3.77
Weight per cent. ..	90.31	89.31	88.81	100	4.69	13.48

Remarks.—Latisall gave the heaviest yield, but is not significantly better than Patnai (23) or Jatakalma (local). There is nothing to choose between the other varieties.

TEST OF AMAN PADDY STRAINS.

BURDWAN FARM (1939-40).

STRAW YIELD.

Analysis of variance.

Variance due to—	Degree of freedom.	Sum of squares.	Variance.	Standard deviation.	Standard error.	Mahalanobis' X .
Blocks ..	5	680.17	137.83	..	..	7.08
Treatment ..	7	714.34	102.05	..	..	5.24*
Error ..	35	681.16	19.46	4.41	1.80	..
Total	47	2,084.67	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

—	Latisail.	Patnai (23).	Jatakalma (local).	₹.Nagra.	Dudkalma (local).	Dudsar.
	1	2	3	4	5	6
Weight in maunds per acre ..	48.33	45.67	45.33	43.67	40.33	38.50
Weight per cent. ..	114.61	108.28	107.49	103.56	95.64	91.30

—	Jhingasail.	Bhasamanik.	General mean.	Error.	Critical difference.
	7	8	9	10	11
Weight in maunds per acre ..	38.33	37.17	42.17	1.80	5.17
Weight per cent. ..	90.90	88.12	100	4.27	12.26

Remarks.—Jhingasail gives the maximum yield, but is not significantly superior to Patnai (23), Jatakalma (local) or Nagra. Dudsar, Jhingasail, Dudkalma and Bhasamanik are of the same yielding capacity.

APPENDIX 1-C.

RESULTS OF DEEP-WATER PADDY TEST, 1939-40.

DACCA FARM.

8 varieties 5 times replicated—area of sub-plot—1/120th acre.

Analysis of variance.

Variance due to .	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Value of X.
Blocks ..	1	1.85	0.46	..	..
Treatment ..	7	46.45	6.64	..	9.22*
Error ..	28	20.25	0.72	.85	..
Total ..	30	68.55	..	..	..

*Significant at 1 per cent. level.

Standard error .. $\frac{.85}{2.23} = .38$
 Error per cent. .. 9.50
 General mean .. 4.06

Summary of results.

Grain.	Baabis.	Gabura.	Gutak.	Notpasha.	Lalkanal.	Dulia.
1	2	3	4	5	6	7
Maunds per acre ..	16.26	15.87	13.95	13.29	12.12	8.85
Per cent. ..	135.50	132.25	116.25	110.75	101.00	73.75

Grain.	Jhul.	Bagrall.	General mean.	Error.	Critical difference.
	8	9	10	11	12
Maunds per acre ..	7.95	7.62	12.00	1.14	3.30
Per cent. ..	66.25	63.50	100.00	9.50	27.50

RESULTS OF DEEP-WATER PADDY TESTS (1939-40).

DACCA FARM.

*20 varieties 3 times replicated, area of sub-plot—1/121st acre.**Analysis of variance.*

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Value of, X.
Blocks ..	2	17.04	8.52	..	..
Treatment ..	19	14.19	0.74	..	0.37*
Error ..	38	75.24	1.98	1.40	..
Total ..	59	106.47	..	..	..

*Not significant.

Standard error .. $\frac{1.40}{1.73} = .81$
 Error per cent. .. 25.55
 General mean .. 3.17

Summary of results.

Grain.	Metakural.	Methuaman.	Shathla.	Kajali.	Ghorbhog.	Hathlal.
1	2	3	4	5	6	7
Maunds per acre	14.25	13.55	13.10	12.34	12.07	11.46
Per cent. ..	148.60	141.30	136.60	128.68	125.86	119.50

Grain.	Hathlal.	Bhojankarpur.	Aswina.	Khalmatar.	Harmati.
	8	9	10	11	12
Maunds per acre ..	11.36	11.01	10.07	9.95	9.83
Per cent. ..	118.46	114.81	105.01	103.75	102.50

Grain.	Kalabuchi.	Gutak.	Gayana.	Hijal Digha.	Khairatjall.	Lafa.
	13	14	15	16	17	18
Maunds per acre ..	9.56	8.62	8.41	7.62	6.53	6.53
Per cent. ..	99.69	89.90	87.70	79.46	68.09	69.00

Grain.	Palkoll.	Dalkachra.	Dula.	General mean.	Error.	Critical difference.
	19	20	21	22	23	24
Maunds per acre ..	5.54	5.24	4.90	9.59	2.45	7.02
Per cent. ..	56.37	54.64	51.10	100.00	25.55	73.20

APPENDIX II.

WHEAT TEST (1939-40).

RAJSHAHI FARM.

7 varieties 6 times replicated—area of sub-plot—1/132nd acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sum of squares.	Mean squares.	Standard deviation.	Value of X.
Blocks ..	5	18.64	..	..	..
Treatment ..	6	6.23	1.04	..	3.25*
Error ..	30	9.50	0.32	0.56	..
Total ..	41	34.37	..	..	..

*Significant at 5 per cent. level.

Standard error	..	..	..	.56	
$\frac{.56}{\sqrt{4}}$				2.44	— .23
Error per cent.	..	..	..	5.68	
General mean	..	..	..	4.05	

Summary of results.

Grain.	P. 52.	P. 80/5.	Jamali (24).	P. 190.	P. 6.
	2	3	4	5	6
Maunds per acre ..	15.70	14.12	13.86	13.13	12.06
Per cent. ..	117.51	105.70	103.74	98.28	97.00

Grain.	Gangajali (5).	P. 111.	General mean.	Error.	Critical difference.
	7	8	9	10	11
Maunds per acre ..	12.21	11.51	13.36	0.75	2.17
Per cent. ..	90.72	86.15	100.00	5.61	16.24

P 52 gives the heaviest yield but is not significantly superior to P. 80/5 or Jamali.

WHEAT TEST (1939-40).

MALDA FARM.

7 varieties 6 times replicated—area of sub-plot—91/17424th of an acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Value of X.
Blocks ..	5	0.59	0.12	..	..
Treatment ..	6	2.85	0.47	..	3.13*
Error ..	30	4.65	0.15	0.40	..
Total ..	41	8.09	..	..	..

*Significant at 5 per cent. level.

Standard error	..	..	..	$\frac{.40}{2.44} = .16$
Error per cent.	..	..	..	11.63
General mean	..	..	..	1.43

Summary of results.

Grain.	Gangajali (50).	P. 52.	Jamali (24).	P. 80/5.	P. 6.
	1	2	3	4	
Maunds per acre ..	13.80	9.34	7.85	6.75	6.75
Per cent. ..	203.04	136.55	114.76	98.68	98.68

Grain.	C. 518.	C. 591.	General mean.	Error.	Critical difference.
	6	7	8	9	10
Maunds per acre ..	5.79	5.55	6.84	0.76	2.19
Per cent. ..	84.65	81.14	100.00	11.11	32.02

WHEAT TEST (1939-40).

PABNA FARM.

9 varieties 6 times replicated—area of sub-plot—3/484th of an acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Value of X.
Blocks ..	5	23.44	..	..	..
Treatment ..	8	20.07	2.51	..	8.10*
Error ..	40	12.40	0.31	0.55	..
Total ..	53	55.91	..	..	..

*Significant at 1 per cent. level.

Standard error	..	..	..	$\frac{.55}{2.44} = .22$
Error per cent.	..	..	..	7.12
General mean	..	..	..	3.09

Summary of results.

Grain.	P. 80/5.	P. 52.	P. 190.	C. 501.	C. 518.	Jamall.
	1	2	3	4	5	6
Maunds per acre ..	14.62	13.98	13.74	13.70	13.50	12.69
Per cent. ..	115.82	112.25	110.36	110.00	108.43	101.92

Grain.	P. 6.	Gangajali (50).	P. 111.	General mean.	Error.	Critical difference.
	7	8	9	10	11	12
Maunds per acre ..	11.88	11.84	5.90	12.45	0.88	2.51
Per cent. ..	95.42	92.00	47.87	100.00	7.06	20.16

APPENDIX III.

TEST OF KALAI (1939-40).

KRISHNAGAR FARM.

12 varieties 6 times replicated—area of sub-plot—2/1089th acre.

Analysis of variance.

Variance due to—	Degree of freedom.	Sums of squares.	Mean squares.	Standard deviation.	Standard error.	Mahalanobis' X.
Blocks ..	5	117.83	23.56	..	..	..
Treatment ..	11	1,757.33	159.76	..	..	4.43*
Error ..	55	1,984.84	36.09	6.00	2.46	..
Total ..	71	3,860.00	..	..	..	..

*Significant at 1 per cent. level.

Summary of results.

Grain.	$\frac{64}{\bar{X}}$	$\frac{31}{\bar{N}C}$	$\frac{87}{\bar{I}V}$	$\frac{95}{\bar{S}}$	$\frac{65}{\bar{S}}$	$\frac{149}{\bar{S}}$	$\frac{73}{\bar{XIII}}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Maunds per acre ..	6.31	5.52	5.32	5.01	4.87	4.87	4.76
Per cent. ..	135.12	118.20	114.00	107.28	104.28	104.28	101.93

Grain.	$\frac{32}{\bar{C}N}$	$\frac{72}{\bar{XIV}}$	$\frac{41}{\bar{XVII}}$	$\frac{23}{\bar{N}C}$	$\frac{37}{\bar{XV}}$	General mean.	Error.	Critical difference.
	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Maunds per acre ..	4.59	4.16	3.96	3.62	3.08	4.67	0.04	0.11
Per cent. ..	98.28	89.08	84.80	77.51	65.95	100.00	0.85	2.36

APPENDIX IV.

Name of varieties.		Date of wilting.	Number of plants wilted.	Diseases observed.
Bhabna-Janai	..	8-11-1939	1	Colletotrichum.
Deshi-Comilla	..	8-11-1939	1	Ditto.
Bangla-Nagpur	..	8-11-1939	1	Ditto.
Deshi-Bogra	..	8-11-1939	1	Ditto.
Bhabna-Fatulla	..	11-11-1939	2	Ditto.
Bangla-Raruli	..	17-11-1939	1	Ditto.
Bhabna-Fatulla	..	17-11-1939	1	Ditto.
Deshi-Comilla	..	4-12-1939	1	Ditto.
Bangla-Nagpur	..	4-12-1939	1	Ditto.
Bhabnai-Janai	..	7-12-1939	1	Ditto.
Ditto	..	11-12-1939	1	Ditto.
Deshi-Janai	..	11-12-1939	1	Ditto.
Bangla-Raruli	..	13-12-1939	1	Ditto.
Ilahia-Barisal	..	25-12-1939	2	Ditto.
Disavari-B. Banki	..	25-12-1939	3	Rhizoetonia.
Bhabna-Janai	..	27-12-1939	1	Colletotrichum.
Ditto	..	2-1-1940	1	Ditto.
Bhabna-Bonhooghly	..	2-1-1940	1	Rhizoetonia.
Ditto	..	6-1-1940	2	Ditto.
Karpuri-Madras	..	6-1-1940	1	Colletotrichum.
Bhabna-Bonhooghly	..	8-1-1940	1	Rhizoetonia.
Karpuri-Madras	..	8-1-1940	1	Colletotrichum.
Deshi-Fatulla	..	8-1-1940	2	Ditto.
Dhaldog-Bonhooghly	..	12-1-1940	1	Ditto.
Bhabna-Bonhooghly	..	15-1-1940	2	Ditto.
Deshi-Fatulla	..	15-1-1940	1	Ditto.
Bangla-Nagpur	..	18-1-1940	1	Ditto.
Karpuri-Madras	..	18-1-1940	2	Ditto.
Disavari-B. Banki	..	18-1-1940	1	Ditto.
Karpuri-Madras	..	22-1-1940	1	Ditto.

Name of varieties.	Date of wilting.	Number of plants wilted.	Diseases observed.
Bangla-Nagpur ..	1-2-1940	1	Colletotrichum.
Bhabna-Fatulla ..	1-2-1940	2	Ditto.
Karpuri-Madras ..	6-2-1940	1	Ditto.
Disavari-B. Banki ..	6-2-1940	1	Ditto.
Bhabna-Fatulla ..	6-2-1940	1	Ditto.
Disavari-B. Banki ..	10-2-1940	1	Ditto.
Karpuri-Madras ..	15-2-1940	1	Ditto.
Disavari-B. Banki ..	15-2-1940	2	Ditto.
Bangla-Raruli ..	22-2-1940	1	Ditto.
Disavari-B. Banki ..	22-2-1940	1	Ditto.
Karpuri-Madras ..	4-3-1940	2	Ditto.

Annual Report of the Fibre Expert to the Government of Bengal for the year 1939-40.

Charge.—I held the charge of the Fibre Section during the year. The posts of Field Assistants were held by Babus Amrita Lal Mukherji and Jnanendra Mohan Sen. Amrita Babu was on leave from the 7th September to 16th October 1939.

The post of Bacteriological Assistant was held by Mr. S. N. Bose until 15th June 1939 when he proceeded on leave preparatory to retirement. Maulvi Amir Hossein has been appointed in his place with effect from the 14th August 1939. He has been sent to Calcutta from 7th March to have Bacteriological training at the Tropical School of Medicine for three months.

Tours.—I was on tour for 77 days, the Assistants for 85 days, Overseer for 118 days and the Fieldmen for 365 days.

Research work.—From the beginning of the year the entire research work on jute was handed over to the Jute Specialist, Indian Central Jute Committee. The section now deals with other important fibre-yielding crops such as Sunn-hemp, Mesta, Roselle, Musk Mallow, Altissima, Rhea, Sisal Hemp, Sida, Flax, etc. More attention can now therefore be concentrated on the very important crop of flax. The supply of jute seed, however, has been retained by this section.

Season.—In April light rain fell in most districts on the Eastern area and proved beneficial to jute and other kharif sowings. A spell of protracted dry weather however, subsequently hampered sowings and had an adverse effect on germination of jute and in some localities in Mymensingh and Rangpur districts such lands were ploughed in with a view to resowing. Otherwise conditions in East and North Bengal continued to be generally favourable. Incessant rainfall and stormy weather in August again affected badly the low-land crops while floods caused considerable damage to the Daisee crop in West Bengal. Rainfall during July and August was much in excess of the normal.

The acreage under jute increased by 28,100 whereas the yield by 2,565,750 bales over the figures of the previous year.

The price fluctuated from Rs. 6 to Rs. 20 per maund owing to large demands of sand bags and of both raw and finished products.

Kharif experiments.—*Hibiscus Sabdariffa* var *Altissima*.—During kharif small experiments were conducted with various fibre crops stated previously. Mesta is an important crop in the bheel tracts of the Madaripur subdivision but the difficulty of procuring good and reliable seed at a reasonable cost is overwhelming. For this, *Altissima* which is akin to Mesta, may have a possibility to replace it if fresh seed could be available for sowing by beginning of November.

It has been found that in Midnapore district it can be successfully grown for seed. Six maunds of seed per acre was obtained this year on average land. Should this be available in time, it could certainly stop importing of Mesta seed of uncertain germination and quality from the United Provinces. It is a heavy fibre yielder and in Java it is utilised for making of sugar bags thus replacing jute bags to some extent.

A subsidiary trial is also being made with Altissima and jute bags by storing sugar in them during the rains to see the moisture absorbing propensity and storing quality of each. We shall definitely be able to come to a conclusion whether this can actually replace jute bags to the extent claimed.

Jute seed.—Three hundred and twenty-five samples of D. 154 and 263 samples of Chinsurah Green Olitorius were received from Mr. A. L. Godden, Agent for the Sale of Government Jute Seed, for germination test during the year under report.

In all 767 maunds 25 seers 12 chattaks of D. 154 (*Corchorus Capsularis*) and 605 maunds 12 seers of Chinsurah Green (Olitorius) seed were sold during the year.

Seed plots of these two types were raised on the Dacca, Bogra and Berhampore Government Farms for meeting the requirements of the Union Board Farms during the coming year.

Flax.—The experiments on flax during the year 1939-40 were conducted with the acclimatised seed as in the previous years.

The grant from the Research Council was utilised for the improvement of flax extraction methods and machineries.

The grant obtained from the Bengal Government was meant for demonstration of this crop in one centre on about 33 acres of land in North Bengal. Accordingly Gaibandha subdivision was selected for the purpose and these plots lay within a radius of 10 miles of Gaibandha town. The crop in all localities did not come up to the mark. The following villages were taken up and the figures within bracket indicate acreage in each village:—

Fedumsahar	...	...	(13)
Udaykhali	...	...	(10)
Haripur	...	...	(4)
Kholahati	...	...	(6)

Moisture deficiency in the Udaykhali village was responsible for the poor crop in this centre. In all other places the crop was generally poor except in a few plots. The results of this crop cannot be embodied in the report as they are not ready yet. At Rangpur Farm the crop was very good. At Berhampore and Dinajpur the crop can be classed as medium. At Dacca Farm the crop was poor to begin with but later with a dressing of ammonium sulphate followed by irrigation improved it. From this year's experiments it can safely be concluded that to get a good crop some chemical manure must be applied in addition to cow-dung or green manure. A mixture of Niciphos and ammonium sulphate may be recommended. Irrigation where moisture condition is deficient has to be resorted to, to ensure a good crop.

Some private firms are interested in this fibre and have grown some flax on their own account.

On one firm's area the crop was much better than the previous year and they are experimenting with power machines for extraction. In this respect their assistance is of great importance. A small plot at one place and big one at another were almost wiped out by diseases and pests.

Burning to make partial sterilization was done at one place and the land was resown. The flax in this area though resown about a month later have come up equal to or even better than those in adjacent plots. At the other various treatments with Kerrol, Formalin, Lime, etc., were tried on the crop which still remained. Here lime appears to have given the better result.

The flax was affected by a type of Rhizoctonia. The plot was under jute in the kharif and it is expected that plots under jute would give better results with flax if limed.

Among the private persons Babu Makhan Lal Roy of Chowrigacha has again grown a large area under flax on his own account. So also Khan Shahib A. Gafur has about 3 acre of flax.

In Bihar, Bettiah Estate Farm also has flax on 2 acres. Good flax can be raised here. The labour is very cheap, but during winter the cultivators in this part may expect to get about Rs. 60 per acre from wheat, so for flax growing if at least this amount can be obtained they may be interested. Mr. Finch of Majbaur concern is also growing flax in 2 acres from the seed supplied from this section. At Karnal in the Punjab 5 acres of flax is being grown for seed.

In the coming year about 66 acres more will be added for 2 additional centres in West and East Bengal sanctioned by the Government. So a large quantity of seed will be required which is expected to be met from the crop at Karnal and some private individuals mentioned above.

The results given in table I are for 1938-39 crops.

Seventeen breaking machines and 17 scutching machines were made during the year. If the work is extended power machineries will have to be imported. This will reduce the cost of extraction enormously. A hand scutching machine is suitable for Bengal condition if it is to be worked as a home industry but the breaking machine being slow in action has to be substituted for a power driven one if any extension of the work has to be effected. Ultimately the retting and extraction work will have to be done in a central place with power machines leaving the growing of the crop only to the cultivators.

Rhea.—We have not yet been able to evolve any easy method of degumming and extraction of this fibre. The laboratory methods are prohibitive and cannot be a commercial proposition.

Sisal hemp.—Trials are being conducted at Lalgarh School and Salboni in Midnapore district for extension of area under this crop in parts of the presidency on such lands as are unproductive because this has the characteristic of growing on such arid and waste lands.

Sunn-hemp experiments.—The experiment on varietal test of sunn-hemp at Berhampore Farm had to be abandoned owing to serious fungus disease. The experiment therefore had to be confined only to Dacca, where the growth was excellent, every plot reaching an average height of over 6'. But when they were just getting in right condition of maturity for harvesting major portion of plants in each plot dried up and as a result the yields were poor. So the experiment will not be repeated for the present.

Laboratory work.—Maulvi Amir Hossain, the new Bacteriological Assistant, after joining was given preliminary training in Bacteriological technique. Then he worked on keeping qualities of milk in

various kinds of vessels. Further work on milk bacteriology will be taken up on his return from training at the Tropical School of Medicine, Calcutta. His services will be partly utilised in giving lectures to the Dairy students.

In this connection I may say that with the expansion of the flax work the service of a combined Chemist and Bacteriologist has become a great necessity and if the attention of the Bacteriological Assistant be diverted to Dairy matters the work of this section is bound to suffer.

Acknowledgment.—Mr. J. Donald of Messrs. Sonakunda Baling Co. gave us help in extraction of flax fibre with his machinery.

Thanks are also due to Mr. Nodder for affording us facilities of his valued advice with regard to flax work and in making spinning experiments.

Among the staff Babus Amrita Lal Mukherjee and Jnanendra Mohan Sen gave me loyal co-operation in working the flax scheme. The services of Babu D. N. Banerjee, District Agricultural Officer, Rangpur, were also of great use in this connection.

Babu Nerode Chandra Chakravarty, my Head clerk, had to work very hard in adjusting the accounts of the various schemes.

NIRMAI CHANDRA BASU,
Assistant Fibre Expert, Bengal, in-charge,
Fibre Expert's Section.

TABLE I.
Results of Flax Experiments, 1938-39.

Place.	Plot No.	Variety.	Area in acres.	Seed rate per acre in lbs.	Date of sowing.	Date of harvesting.	Yield per acre of—		Per centage of fibre to dry weight of straw.
							Seed in lbs.	Straw in lbs.	
Dacca	1	L. M. Rangpur ..	·05	120	21-10-1938	18 and 19-1-1939	300	2,860	8·7
	2	J. W. S. Rangpur	·05	120	21-10-1938	28-1-1939	390	2,720	8·8
	3	Cawnpore 16 ..	·05	120	16-10-1938	3-3-1939	290	2,100	5·7
	4	Cawnpore 17 ..	·05	120	16-10-1938	2-3-1939	345	2,380	3·8
	5	Oil flax Hamburg ..	·05	120	21-10-1938	1-3-1939	365	2,620	6·4
	6	J. W. S. Karnal ..	·05	120	21-10-1938	22-1-1939	350	2,660	8·2
Rangpur Demonstration Farm.	1	L. M. Berhampur ..	·1	120	4-11-1938	17 and 18-3-1939	200	3,444	9·1
	2	J. W. S. Karnal ..	·1	120	4-11-1938	18 and 19-3-1939	230	3,218	10
	3	L. M. ..	·1	100	4-11-1938	19-3-1939	150	2,829	11·3
	4	J. W. S. ..	·1	100	4-11-1938	20-3-1939	180	2,952	10·5

Place.	Plot No.	Variety.	Area in acres.	Seed rate per acre in lbs.	Date of sowing.	Date of harvesting.	Yield per acre of—		Percentage of fibre to dry weight straw.
							Seed in lbs.	Straw in lbs.	
Rangpur Demonstration Farm— <i>concd.</i>	5	L. M.	·1	120	4-11-1938	20-3-1939	100	2,460	10·9
	6	J. W. S.	·1	120	4-11-1938	20 and 21-3-1939	170	2,829	11·3
	7	L. M.	·1	100	4-11-1938	21-3-1939	150	2,419	13·2
	8	J. W. S.	·1	100	4-11-1938	21-3-1939	220	3,218	8·8
Dinaipur Farm ..	1	Do.	·5	100	1-11-1938	15-2-1939	300	2,050	8·8
	2	Do.	·5	120	1-11-1938	16-2-1939	270	2,152	9·5
	3	Do.	·5	100	1-11-1938	16 and 17-2-1939	214	1,575	4·4
	4	Do.	·5	120	1-11-1938	17 and 18-2-1939	250	2,985	7·9
	5	Do.	·5	100	1-11-1938	18-2-1939	260	2,395	8·9
	6	Do.	·5	120	1-11-1938	19-2-1939	440	3,015	9·6
Berhampore Farm ..	1	J. W. S. Karnal	·1	120	4-11-1938		150	1,230	15
	2	Do.	·1	100	4-11-1938		215	1,880	7·1
	3	Do.	·1	120	4-11-1938		450	2,460	13·7
	4	Do.	·1	100	4-11-1938		575	3,140	8·2

5	Do.	..	..	..	120	4-11-1938	3-3-1939 to 11-3-1939	590	3,980	7.9
6	Do.	..	..	..	100	4-11-1938	11-3-1939	645	4,020	12.1
7	Do.	..	..	..	120	4-11-1938		600	4,200	14.2
8	Do.	..	..	..	100	4-11-1938		585	3,590	11.5
..	J. W. S.	..	2.89	40 to 120	29-11-1938 to 12-12-1938	4-3-1939 to 20-3-1939		177	1,248	7.9%
..	L. M.	..	3.85	40 to 120	"	"		138	1,098	7%
..	J. W. S.	..	6.19	60 to 120	2 to 9-11-1938	..		258	762*	..
..	Do.	..	.78	100 to 120	9-11-1938	..		338	1,333	..
..	Do.	..	3.35	120	1 to 12-12-1938	19 to 24-3-1939 and 1-4-1939		289	1,741*	..
..	Do.	..	.34	120	26 and 27-11-1938	10 and 11-3-1939		..	2,586	..
..	Do.	..	..	120	..	..		..	1,968†	..
..	Do.	..	.33	120	..	..		..	622	..
..	Do.	..	.33	120	..	..		..	544	..

*Damaged by cut worm.

†Fibre too short to work with.

Annual Report of the Second Economic Botanist, Bengal, for the year ending 31st March 1940.

Charge.—I held charge of the post of Second Economic Botanist, Bengal, throughout the year under report.

Introduction.

Staff.—There are 1 Laboratory Assistant, 1 Field Assistant, 1 Overseer and 6 Fieldmen attached to the section.

Tour.—The Second Economic Botanist, Bengal, was on tour for 110 days and the members of the staff for 218 days.

Leave.—Maulvi Hashimuddin Ahmed, Field Assistant, was on leave from 1st June to 15th July 1939.

Maulvi Mofakhar Hossain, Overseer, officiated.

Maulvi Mofakhar Hossain, Overseer, was on leave for 47 days from 2nd January 1940 to 17th February 1940. No substitute was taken.

Season.—The months of April and May were practically dry and sowings of kharif had to be consequently delayed. There was excessive rainfall during the months of July and August and the number of wet days were abnormally many. The early part of August again had unprecedented cyclonic storms. Cotton wherever sown late suffered heavily during the months of July and August, and in many centres cotton plots were submerged over long periods. The arhar crop suffered especially during the month of August. The spacing system of planting proved for the first time a failure and broadcasting had an advantage over the improved system, as the plants being closer together offered resistance to the cyclonic storm. For the rabi crops, the season was very unfavourable especially for the oilseed crops. For the first time wilt was noticed on linseed at the Berhampore Farm. Wilt was also reported on cotton at the Rajshahi Farm and the Comilla Centre. In drier tracts good yields from cotton were obtained.

Report on the crops dealt with by this section.

Cotton.—(a) The scheme for the introduction of short staple cotton, undertaken with the financial aid of the Indian Central Cotton Committee, Bombay, and worked out at Rangamati is in the fifth year of its running. Survey of cotton of Chittagong Hill Tracts was continued and large amount of material is under observation. The scheme has been extended for a further period of two years.

The report will be found in Appendix I.

(b) *Dacca Farm.*—About 135 varieties are under study. Promising 8 strains are being studied in detail. Dacca No. I, a strain of *Gossypium Berbadensis*, fared better than in previous year, as a result of adding sand to the clay soil. A good deal of work, however, has as yet to be done to put this variety on a crop basis. We believe that it would be possible by careful technique to grow this variety in the Dacca Farm. Dacca No. 8 (Kampala) also requires restricted conditions of growth, which are being studied.

Cotton.—Dacca Farm.

Varietal experiment—spacing 4' × 2'. 8 varieties were tried.

~ Dacca No. 1 to Dacca No. 8.

Yields of 50 plants are appended below:—

	Sr. ch. tola.	Weight of seed cotton.	Weight of seeds.	Weight of lint.	Ginning percent- tage.	Lint. length.
		Gram.				m. m.
Dacca No. 1 ..	0 4 0	5.70	3.66	2.04	35	36.7
Dacca No. 2 ..	1 12 4	6.35	4.89	1.96	28.6	29.1
Dacca No. 3 ..	2 2 2	5.60	4.08	1.52	27.1	30.1
Dacca No. 4 ..	1 4 0	4.44	3.35	1.09	24.5	28.9
Dacca No. 5 ..	3 3 4	7.89	5.62	2.27	28.7	30.1
Dacca No. 6 ..	3 15 3	6.98	4.90	2.08	29.7	25.7
Dacca No. 7 ..	3 7 2	5.45	3.91	1.54	28.2	28.4
Dacca No. 8 ..	0 5 3	5.20	3.60	1.60	30.7	35.8

From points of quality it is found that Dacca No. 5 is the best. The experiment would be continued next year.

Spacing experiment—Variety Dacca No. 2. Yield from 10 plants selected at random:—

				Spacing.	Yields.
					Sr. ch. tola.
1st ..	..	..	..	3' × 1½'	5 5 2
2nd ..	..	..	..	3' × 2'	7 3 0
3rd ..	..	..	..	3½' × 1½'	9 6 0
4th ..	..	..	..	3½' × 2'	9 4 1
5th ..	..	..	..	4' × 1½'	12 2 0

Time of sowing experiment. Variety—Dacca No. 2:—

			Number of plants.	Yield.
				Sr. ch. tola.
15th May ..	..	..	84	7 10 4
22nd May ..	..	..	60	4 14 4
29th May ..	..	..	95	4 7 0
5th June ..	..	..	85	7 7 3
15th September ..	..	..	98	0 7 2
22nd September ..	..	..	96	0 5 4
29th September ..	..	..	92	0 2 0

* *Mixed cropping.*—Cotton was sown mixed with aus paddy and groundnut A.H. 18 on an area of 1 bigha. Results are given below:—

				Yield per acre.		
				Md. sr. ch.		
Cotton Dacca No. 2	..	..	..	2	35	2
Groundnut	..	..	..	1	3	14
Aus paddy	..	..	..	3	34	11

Multiplication area.—Variety Dacca No. 2—area 1 bigha. Outturn 7 maunds 30 seers 14 chattaks per acre.

There were 6 cotton centres during the year under report, at Bankura, Midnapore, Murshidabad, Naogaon, Mymensingh and Comilla. The last two centres were selected at a very late hour.

This year's reports from the centres were not favourable.

Details would be found in Appendix II in the report submitted to the Cotton Committee, Bengal, on the introduction of long staple cotton for the year 1939-40.

A sum of Rs. 1,600 had to be distributed to the cotton growers during the year under report.

The Cotton Committee met on the 4th of March 1940, where (1) report on the introduction of long staple cotton in Bengal for the year 1940, (2) next year's programme of work, (3) the manurial scheme for the introduction of Dacca No. 1 were placed before the members. This would be found in Appendices II, III and IV.

The proceedings of the meeting would be found in Appendix V.

Apart from the centres cotton was grown by many private parties, especially by the Sree Hanuman Cotton Mills, Fuleswar, by the Planters' Union, at Bardhankuti (Rangpur), at Dignagar (Krishnagar) and various other places.

Good reports have been received from Dignagar and Bardhankuti. Results from other places have not yet been received. Cotton for the first time was grown on many Government Farms, Rangpur, Rajshahi, Burirhat (Rangpur), Krishnagar and Berhampore. At Rajshahi, the crop was affected by wilt, at Berhampore and Krishnagar good results have been obtained, but the pickings are not yet complete and hence the results would be reported upon in 1940-41 report. At Bankura Farm, the spacing and time of planting experiment of Dacca No. 2 and Dacca No. 3 were continued. The results have not yet been received, but the possibility of growing cotton in these districts as a crop are established.

Reports on cotton (first picking) grown in different centres, 1939-40:—

District.				Ginning percentage.	Lint length.
1.	Mymensingh	..	..	31.08	31.08
2.	Comilla	..	..	32.3	32
3.	Midnapore	..	..	27	29.8
4.	Bankura	..	..	34.9	34.2
5.	Murshidabad	..	..	29.9	31.2
6.	Naogaon (Rajshahi)	..	..	23.07	31.4

Samples from the different centres have been sent to the Technological Laboratory, Bombay, for favour of report.

A new cotton gin of the Macarthy type as recommended by the Indore Station and Matunga Laboratory has been received from Greaves and Co., Bombay.

Arhar.—About 153 varieties are under study. Many dry tract varieties suffered during the first part of August when cyclonic storms prevailed. The varietal trial was a failure. The results are appended below :—

Sowing.		Area.	Variety.	Outturn per acre.	
				B. k. ch.	Md. sr. ch.
Broadcast	1 11 6	6 20	6 28 0
4' × 2'	1 6 4	6 20	4 23 0

Cowpea.—

Variety.			Area.	Yield per acre.	
				B. k. ch.	Md. sr. ch.
Brabham	..	..	1 0 0	1 10 0	0 0 0
Victor	..	..	0 5 0	0 0 12	1 0 0
Kapoor	..	..	0 5 0	1 0 0	2 4 0
W. P. W. (black)	..	..	0 5 0	1 25 0	0 37 0
L. S. K. I	..	..	1 0 0	3 0 0	1 25 0
L. S. K. II	..	..	1 0 0	0 37 0	0 37 0
Groit	..	..	1 10 0	3 0 0	0 37 0
L. S. K. I	..	..	1 11 0	1 25 0	0 37 0
L. S. K. II	1 14 0	0 37 0	3 0 0
Groit	3 1 12	3 0 0	

Gram.—

S. 4	0 5 0	3 20 8
P. 58	0 5 0	7 25 8

Lentil.—

Lentil No. 5	0 5 0	3 10 0
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Fodder.—

Variety.			Area.	Yield per acre.		Remarks.
				B. k. ch.	Md. sr. ch.	
Rajshahi Juar	1 9 3	2 30 0	0	Kharif.
Krishnagar Juar	..	..	1 14 6	7 9 0	0	Do.
Rajshahi Juar	..	..	0 8 6	5 14 0	0	Do.
Rajshahi Juar	..	..	1 0 0	4 27 8	8	Rabi.
Krishnagar Juar	..	..	1 0 0	4 18 8	8	Do.
Bajra 11/10	..	..	0 14 8	3 31 0	0	Do.
Bajra 11/10	..	..	0 10 0	1 2 0	0	Do.

Oil Seeds.—Groundnut.—Forty-two varieties were tried both in kharif and rabi, and characters like habit, maturity and yield, incidence to disease are being noted. Two or three varieties appeared already promising and would be multiplied. Six hundred maunds were distributed this year in the district of Bankura. It has been reported that the experiment is a success and that the Collector desires to put 10,000 acres under this crop during the year 1940-41 from seeds already obtained. The Madras groundnut experiment is conducted at Krishnagar and Berhampore under the directions of the Oilseed Specialist, Madras. The results are not yet available.

Mustard.—Four centres, 150 bighas each, at Rangpur, Basirhat, Gopaldi (Dacca) and Berhampore were established for the purposes of rapidly multiplying the departmental recommendations of Tori 7 and Rai 5 with intention of distributing 1,200 maunds of seed free to the mustard-growing cultivators throughout the province of Bengal. The first three centres were for the multiplication of the departmental recommendation of Tori 7 and the centre at Berhampore was for the multiplication of Rai 5, another departmental recommendation. The centres at Basirhat (24-Parganas) and Gopaldi (Dacca) were utter failures where only 5 maunds 30 seers and 10 maunds 15 seers, respectively, were collected. At Rangpur and Berhampore 200 maunds of mustard seed at each place has been collected and stored. The seeds collected along with seeds from other parts would be distributed during the coming year according to the quota that would be allotted for each district, according more or less to importance of the crop for the district.

The results of mustards grown at the Dacca Farm are appended below:—

Variety.	Area.				Yield per acre.		
	B. k. ch.				Mds. sr. ch.		
Tori 7	2	12	0		1	25	0
Rai 5	1	12	12		4	6	0

Linseed.—The experiment is in the fourth year of its running. It is undertaken with the financial aid of Imperial Council of Agricultural Research and is conducted at the two farms, Dacca and Berhampore. The oil is tested for the Iodine value at the Dacca University Laboratory. The annual report of linseed experiment in Bengal for the year 1938-39 would be found in the Government of Bengal Publication, 1940.

During the year under report 279 general varieties were grown as single plots both at Berhampore as well as at Dacca. The selected 20 varieties were split up into two parts, the best five and the rest. The

best five varieties were grown in 10 replications both at Berhampore and Dacca. The results are appended below:—

Name of variety.	Mean weight of seeds in 10 replications in gram.		Remarks.
	Berham- pore.	Dacca.	
B. 58	164.656	134.60	At Dacca the plot size was 7' 6" × 3' whereas at Berham- pore it was 23' × 4' 6".
P. H. 52	44.638	114.55	
P. 17	56.164	141.90	
P. H. 6	73.173	125.05	
B. 17	109.942	136.20	

Four varieties were tried at Dacca with 3 different sowings and 15 replications. Yields in grams are appended below:—

Plot size.	Name of variety.	1st sowing.	2nd sowing.	3rd sowing.
5' 6" × 4'	B. 58	119.286	128.846	173.10
	P. H. 52	111.23	105.36	137.06
	P. 17	124.6	141.40	.. (a)

(a) As there were no seeds, this sowing could not be done.

At Berhampore Farm the three varieties with 3 sowings and 5 replications were grown on plot sizes of 14' 6" × 4' 6".

Yields are appended below:—

Name of variety.	1st sowing.	2nd sowing.	3rd sowing.
B. 26	99.0	155.00	At Dacca the plot size 4' × 3' and the total number of plants for each variety was 63, whereas at Berhampore the plot size was 14' 6" × 9' 6" and weight of 100 plants only are recorded.
P. H. 76	99.5	083.63	
B. 61	96.0	278.33	
P. H. 79	55.0	047.27	
B. 66	73.5	139.66	
B. 62	115.0	148.66	
P. 63	50.0	153.66	
P. H. 90	82.0	101.08	
P. H. 85	58.0	103.44	
P. H. 71	56.0	080.00	
P. 12	113.0	085.00	
P. 31	80.5	135.00	
B. 28	121.5	146.33	
B. 16	90.0	162.00	
P. H. 75	103.5	058.00	

The selected best three varieties were under different times of sowing, with five replications each.

The seeds from the three different times of sowing experiment and the varietal replication experiment would be sent to Dacca University for Analytical Report. The analytical results would be found in Appendix VI.

Exhibitions.—Seven sets of exhibits were sent to the Deputy Director of Agriculture, Eastern Circle, for his circle and one set to the Subdivisional Officer, Rangpur (Sadar). A cotton set was also sent to the Agricultural Demonstrator, Bolpur.

Appreciation.—Babu Amitava Sen, the District Agricultural Officer, Berhampore, and Babu Digen Banerjee, the District Agricultural Officer, Rangpur, deserve special mention in connection with the mustard multiplication work.

S. G. SHARANGAPANI,

Second Economic Botanist, Bengal.

Programme of work for next year.

Cotton.—Four centres at Bankura, Midnapore, Krishnagar and Mymensingh have been selected. A probable fifth centre would be at Rangpur. The sixth centre is yet to be selected, for which there are two offers, one from Berhampore (Rai Sahib Shamapada Bhattacharjee Bedantabagis), Sub-Deputy Collector, and another from Birbhum (Bisva Bharati).

The following 5 varieties Dacca No. 2, Dacca No. 3, Dacca No. 5, Dacca No. 6 and Dacca No. 7 will be tested in varietal replicated plots for ascertaining their merits from point of yield and quality.

Dacca No. 1 and Dacca No. 8 would be grown under special conditions and their requirements studied. The time of planting replicated experiment will be undertaken. The spacing experiment would be discontinued for want of space. Cotton may not suit Bengal as a pure crop. The following mixtures would be tried: Aus paddy, groundnut, cowpea and chillies. It is also believed that rank growth due to excessive rainfall affects considerably the yields and is conducive to a large increase of attacks from insect and fungus pests and is also responsible for low quality of cotton. It is proposed therefore to take up this question for study.

The study of 131 varieties would be continued.

Arhar.—One hundred and fifty-one varieties would be under trial. Each variety is one single line consisting of 10 plants and is being studied from point of earliness and yield, resistance to insect and fungus attack, as well as to find out whether arhar could be successfully grown as a rabi crop. Comilla 6-20 would be grown for multiplication. A varietal trial of a few promising varieties would be undertaken.

Groundnut.—Forty-two varieties will be under detailed study from point of view of habit, maturity, yield and freedom from disease. Four selected varieties in 5 replications would be grown mixed with cotton or arhar. The experiment at Bankura would be watched with keen interest.

Mustard.—About 500 maunds would be distributed next year throughout the province and 1,200 maunds would be raised for free distribution during the year 1941-42.

Linseed.—The linseed experiment would be continued on practically the same lines. The plot sizes and the number of replications for the selected varieties would be decided upon.

Work of multiplication on juar, bajra, cowpeas, mustard, lentil and gram would be continued.

APPENDIX I.

*Comilla Cotton Scheme.***Programme of work for 1939-40.—**

1. Replicated progeny rows will be extended.
2. New selection will again go on joom and terraces.
3. Survey material of 1937-38 will be tested in preliminary replication.
4. Survey material of 1938-39 will be tried in non-replicated lines.
5. Spacing experiment will include two distances and three time, if land is available for the experiment. Failing that row distance spacing will be done.
6. Small bulks from replicated progeny rows and new selections will be compared with each other for yield and ginning percentage.
7. Survey of the Hill Tracts particularly of places adjoining Nakyanchari, Lama, Ruma, Banderban, Barkal, Ramgarh, Ajodhya, Panchari and Dighinala. Survey of these places has given very wide variations. If possible Feni and Sajek valley survey will be taken up.
8. Hybridisation work will be taken up if permitted. The parents will be chosen from G. Arborium L. Var Forma Indica and G. Arboreum L. var Cernuum. For fixing isolating a higher ginner. Academic character will be neglected to speed up the results.

COMILLA COTTON SCHEME.**Progress Report, Summary, 1939-40.**

The scheme came into operation in December 1934 for the improvement of the Comillas. The first two years were utilised for growing local varieties and varieties from other parts of India, to study the growth and fruiting of plants in this tract. Uniformity trials were started. Replicated progeny rows and other small trials started in 1937-38. Besides the continuation of regular work survey of the hill tracts was taken in 1938-39. Material collected in the tours was classified for ginning percentage and lint length. 1939-40 was the year of interim extension. Besides the replicated progeny row work, where we have 28 strains under trials for yield and ginning percentage the year had some 490 single lines under observation. These were formed from two years' survey work. Some of these lines are very promising. Replicated progeny row will be formed (for better observation) out of the seed. Twelve bulks for seed multiplication were formed from the lines of replicated progeny rows of 1938-39 that were thought to be pure. These were sown in the joom. One of these has proved to be good yielder, good in class with fairly good ginning percentage of 42.5 per cent. The wax content of the fibre—its coarseness—is equal to that of Garo Hill cotton. Twenty-two bulks were also formed from trials of survey. Out of these Nos. 14 and 19 are worth mentioning. Both these are capable of giving good yield, possess the necessary

hardiness and come to 43 per cent. in ginning percentage. The cotton is, however, slightly less rough than that of No. 9. Yield trials of these strains will be started next year in latin square on joom.

Survey work was given much more attention than in the previous years. The method was changed to suit the tract. Samples were collected with a note regarding their plant characters whenever possible. Total output of work has been satisfactory in the distanced covered, number of samples obtained and knowledge of the localities. What such an intense survey can do, will be judged by the fact that out of 60 different mauzas surveyed only two outlying paras, i.e., sub-sections of villages gave samples with an outstanding ginning percentage of 46 per cent. :—

			Range.	Mean.	Model class.
Ginning percentage	..	..	30-55	42.368 + 1.396	43
Lint length	..	..	13-25	18.418 + 1.552	18

Programme of work for the year 1940-41.

1. Replicated progeny rows of 25 cultures from strains that are with the section for more than three years.
2. Yield trials of six strains in six replications of bulk seed raised last year from replicated progeny rows and survey lines for testing Nos. 9, 14 and 19. Stand, yield and ginning percentage to be considered.
3. Making preliminary bulk from more or less pure-lines from replicated progeny rows and from survey lines tested for two years.
4. Building replicated progeny row from 40 selected lines from the survey sowing of last year.
5. Trials of small bulks on joom and terraces to assess the joom value of a plant grown in terraces.
6. Continuation of purified parts of survey lines with high ginning percentage and good yield of last year in non-replicated lines.
7. New survey lines to be tested for ginning percentage and yield.
8. Trials of cottons collected from Naga, Lushai, Manipur, Kacher and Garo Hills with a view to acclimatising the most suitable type if found.
9. Survey of outlying mauzas to the north and north-east and extreme south.
10. Seed of crosses obtained last year to be sown and some more crosses to be made.

Progress Report, 1939-40 (Comilla Cotton Scheme, Rangamati).

There was no change in the staff of this section. Tabulation work was completed just in time for the report but if work expands, as it is bound to next year, it is feared it will be too much for three people to cope with.

This section is allotted one room in the farm premises. At present it is crammed to its capacity with implements, cotton bags and furniture. Besides this lack of moving space, noisy hand-gins have to be kept working for the last three months while a lot of tabulation work of year's observations, which needs quiet, is on hand. A separate godown will considerably ease off the strain.

The Second Economic Botanist, Bengal, visited Rangamati on the 16th June last, when he inspected all books and records. He also went through all the lines and gave valuable suggestions with regard to the working of the programme.

The Cotton Research Officer was on tour for 66 days. Among the places visited are Ramgarh and Dighinala to the north, 16 miles up Barkal to the east and Banderban southwards during survey time. The two Fieldmen were in mufassil in connection with survey work for 48 days. An account of the tour is given elsewhere under the heading survey.

The rain commenced on the 10th May. Sowing was started immediately within two days. By the time the sowings were half way through the rains became so persistent that land had to be prepared everyday for sowing till the 1st of June. This incessant rain was responsible for a lot of damage to the germinating seed and seedlings. Consequently even after three resowings some of the lines showed big gaps and one replication of progeny rows had to be abandoned as the seedlings were transplanted in other blocks for filling gaps. The district crop too suffered like ours. Indeed it was worse. June gave some time for interculture in the terraces but after that rain and more rain poured till October when the total amount recorded went up to 103.1 inches. The cold weather was not very severe during the time the crop was in the soil but the sudden stoppage of rain after continuous downpours reduced the number of pickings. Thus the short crop of the season is due to smaller population of plants per acre and secondly to the season.

Crop pests are a menace in this district. There are bark-eating beetles, shoot-borers, root nematodes and boll works. The last two are most injurious. Nematode attack is the most severe during the tender stages of the plant. The extent of damage can be estimated from the fact that at the end of the season when 7,760 plants were pulled out, all the plants were found to have injured tap roots and nematode nodule except 96 plants. Boll work is comparatively inactive during the early part of fruiting but assumes a threatening offensive after the second picking.

Damping off during seedling stage is very common. Wilt was not observed this year. Anthracnose rot of bolls is responsible for considerable damage to the crop. In particular the early sown crop suffers to such an extent that the first flush of bolls is lost entirely.

Experiments.—(i) Replicated progeny rows were originally in six replications but only five were retained. The 28 cultures tried came

from last year's replicated progeny rows and spacing experiment. All these strains are under observation for the last five years. Leaving one strain (ii) that is, Khaki linted all the rest are white. They exhibit sympodial character but are prone in some case to give 3-4 vegetative branches. Flowers are produced after 7 weeks and within 9 weeks of sowing on terraces but they can be delayed by joom sowing. These strains are in a pure state. Some of these are the long boll type and give an average of 13 seed per locule, though this character depends entirely on the freaky nature of fertilisation. For the same plant has been observed to give bolls from a range of 9 to 13 seed per locule. This potential quality of producing bigger bolls will be exploited.

It is proposed to bulk up some of the families that are not significantly different with regard to ginning percentage and lint length, and try them on joom next year where it is hoped they will show their true ginning percentage. As these strains are under terrace cultivation for long time they have become finer and show reduced ginning percentage.

(Table in Statement I.)

New selection experiment failed utterly on the terraces. There was not enough seed of the single plants chosen for the experiment for three resowings and consequently the experiment had to be retained only as non-replicated single line cultures. The joom sowing too was similarly treated as it was also very gappy; but this item of work cannot be omitted and it is proposed to make trials with small bulks instead of lines to avoid any mishap like the above.

(iii) Spacing and dates of sowing were combined in one experiment with 4 types. In view of the remark against this experiment no time was spent on it. Yet the pickings and G. P. indicate that variables like height and yield react to dates by giving lower outturn and shorter plants as the sowing is delayed but ginning percentage and lint length, the constant characters are not affected.

(iv & v) The non-replicated lines of survey material can be classified into two (1) those lines that were sown in the last season, (2) those trials were sown during the season under report. There is evident general fall in the ginning percentage after transition from joom to terrace in their first year of coming to terrace. But lines sown last year and again sown this year in the farm show that they are keeping up the average ginning percentage of previous year. Most of the lines are in a pure state for leaf shape, flower colour and size. There are some lines which bear a very small corolla measuring $\frac{3}{4}$ ", while others give flowers of the normal size. The bracteoles are not necessarily very big. The shape of the boll is usually $2\frac{1}{2}$ " long and 2" in girth at maturity and the number of seed per locule is on an average 11. The average ginning percentage on terraces is 37.97 ± 3.019 , modal class is 40. I feel they can be classified as slightly smooth against rough ones. There are lines amongst the smooth type that measure 24 mm. maximum halo length, but majority belong to the class of 18-19 mm. with mean 19.57 ± 1.61 mm. modal class 19 and range 14-25 mm.

Lines grown this year show the same character in general as those in section one, except for the fact that as it was their first year on terraces, there is a sudden drop of 6 per cent. in their ginning percentage.

With regard to their cropping capacity the number of bolls per plant comes to 3.25 grms. average node number 11.95 modal class 12 and range 8.23 mean yields in grammes 3.9 modal class 2 grms.

Peculiarities.—(a) Ruma, Khagrachari cultures show least variation of 37.43 per cent. ginning percentage. Tainfa and Dardari give biggest variations 30.46 per cent. Best ginning percentage obtained is 40 per cent. in 6 cultures. Infrequency of bolls 75 per cent. of the crop from each village is realised in combined frequencies of one boll, two bolls and three bolls but Dardari, Mahalchhari and Khagrachari take one more class to give their 75 per cent. yield.

In lint length Ruma produces the shortest fibre of 16 mm. Biggest variation is seen in Lama material with range from 15.24.

These lines are pure white linted. In class they are superior to the ordinary joom sample. Some 40 of the best lines will be taken next year for study in progeny rows. Other valuable ones will be replicated in small bulks, while still others will be retained in non-replicated lines.

(vi) The joom was sown with 12 bulks from material that was on hand for four years, either in progeny rows or in some other experiment. These were primarily intended for multiplying seed for making yield trials and were not replicated. Out of these No. 9, the bulk of H. 10 local cotton line has given very good results in the matter of final stand, yield and ginning percentage. It was also adjudged to be superior to others in colour and feel, being the coarsest. This was, therefore, sent to the Technological Laboratory, for fibre length and wax content. This strain has, it appears, passed the test as will be seen from the report of the Director, Technological Laboratory, Matunga, Bombay, in the Statement II.

The 22 bulks from survey material of last year were tried on joom for seed multiplication. Out of these Nos. 14 and 19 were thought sufficiently good for being sent to the Technological Laboratory. The report on them is not disheartening although not quite so good as No. 9. These three bulks Nos. 9, 14 and 19 will be tried in 6 replications on joom next year. Preliminary bulks of some survey lines and lines from replicated progeny rows of this year will also be tried next year on joom.

Survey work of this year.

(vii) Instead of the Cotton Research Officer alone going on tour it was decided that the Fieldmen should be given a circle in which they were to collect at random a sample from every village. Wherever possible the leaf lobe too was noted. As the season was rather short expected quantity of work could not be put in. However, even with this disadvantage we could secure 6,076 samples from 88 paras and villages. The departmental demonstrators also rendered us some help by collecting material when they were on their routine tours. The new process has enabled us to cover and thoroughly know the condition of the crop and its environment in 30,000 acres. Broadly speaking, the cottons of the southern tract are softer than of north area. The south also shows predominance of broad-lobed type while in the north, narrow lobed is

preponderant. This intense work has rewarded us with some very good samples of average 46 per cent. ginning percentage in a sample of 250 plants. Frequency charts of the material have been prepared with regard to weight per boll, ginning percentage and lint length. Interesting results are expected out of this collection. See Statement III.

(a)

			Range.	Mean.	Model class.
Ginning percentage	..	..	30-55	42.368 + 1.396	43
Lint length	..	..	13-25	18.418 | 1.552	18

(b)

	Ginning percentage.		Lint length.		Yield.
Maximum Variation ..	Maschari	30-55	Dighnala	13-24	
	Ghumara	34-55			
	Gidchari	33-54			
	Nunchari	33-53			
Minimum Variation ..	Begnachari	38-45	Taimati	17-23	
	Ramgarh	39-45			
Least average ..	Banderban	39	Sangrachari	17	
Best average ..	Joyasala	46	Miangkyong	21	
	Nowbhanga	46	Ilaphvang	21 Murin	

(viii) Some Assam cotton was kindly sent by the Economic Botanist, Assam, for trial here. The Second Economic Botanist, Bengal, had secured 1 boll of Garo Hill. These were tried here. Except two cases the Garo Hill plants did not survive the attack of root nematode. The two survivors were tended till the end of the season when only one of them bore a boll. As with others, in this case also, the ginning percentage is less than the parent but what is really disheartening is the reduction in the number of seed per locule. However, it may be too broad a deduction from the result of a single plant. The sample received from the Economic Botanist, Assam, was not found to be better than the average good lines of our selection. The size of the boll is usually $2\frac{1}{2}'' \times 2''$ with average ginning percentage of 42 per cent. Out of 4 strains in the sample one that showed extra sympodial nature is likely to be of use here. One plant was recorded to be a thorough monopodial and started fruiting in December. Four plants gave broad-lobed leaves and two were found to have mauve colour stems. The corolla is normal size in all cases. Time of bursting of anthers is just before or with the sunrise, a feature not common in Indian cottons. All the isolations will be tried next year to confirm this year's observations. During spare time some crosses of the long boll with small boll

type were effected. Some ten such crosses that took, are in hand. The economic utility, only, of the hybrids will be studied.

(ix) *General observations.*—There is some ambiguity with regard to the demand of the trade. For the present the merchants of Chittagong and a prominent exporter of Calcutta favour a cotton of bright colour combined with coarseness. But as we have four different varieties of cotton on staple basis, a reference was made to the Director, Technological Laboratory, Matunga, Bombay. His reply shows that the mill-owners in India would like to have a better staple and some coarseness at cheap prices.

The possibility of long staple in this tract was subject of a query from an Assembly member. Some of the cotton mill promoters of Chittagong would like to see medium staple and long staple being grown here.

With regard to the method of selections it is feared that isolation of pure-lines will take a long time and will ultimately not be very useful as the inaccessibility of interior places of the district renders any supervision on pure seed joom very difficult while the local people are entirely ignorant of the value of good seed. It is feared that any strain developed after such work will run out in a short time. Rather than see such a failure, it would be better to start on mass selection and keep a few jooms near about Rangamati for seed stock renewal while other and better strains are being evolved and the Jumia learns the advantage of keeping his own valuable seed.

The Director's grant of Rs. 100 towards cultivation charges has been very useful to this section and is gratefully acknowledged. Major G. L. Hyde, the Deputy Commissioner, has all along showed keen interest in cotton work and has often helped us for which this section is obliged to him also.

STATEMENT I.

Financial Statement of the Bengal Comilla Cotton Scheme for the year 1939-40.

1. Date of sanction of the scheme—1st December 1934.
2. Period of sanction—5 years.
3. Extension, if any—Interim extension for 4 months.
5. Year of working—5th year with interim extension.

Serial No.	Total grant sanctioned for the scheme.	Year.	Sum allotted.	Expenditure.	Excess or balance.
	Rs. a. p.		Rs. a. p.	Rs. a. p.	Rs. a. p.
1	18,540 0 0	1934-35	918 0 0	875 9 0	42 7 0 Balance.
		1935-36	4,272 0 0	3,863 2 9	408 13 0 "
		1936-37	4,677 0 0	4,294 13 9	382 2 3 "
		1937-38	4,265 0 0	4,121 5 6	143 10 6 "
		1938-39	4,701 2 0	4,520 9 3	380 6 9 "
		1939-40	6,178 0 0	6,166 9 7	11 6 5 "

Stand at Maturity.	Yield.	Mean G. P.	Mean L. L.
Significant difference 10.	Significant difference 63.	Significant difference 5.2.	Significant difference 0.84.
Standard error 13.5 per cent.	Standard error 41.2 per cent.	Standard error 5.04 per cent.	Standard error 1.54 per cent.

[illegible]

STATEMENT II.

INDIAN CENTRAL COTTON COMMITTEE TECHNOLOGICAL LABORATORY.

Fibre Test Report No. 285.

On three samples of cotton submitted by the Cotton Research Officer,
Rangamati, Chittagong Hill Tracts (Bengal).

Sample No.	Cotton.	Season.
X 1315	No. 19	1939-40
X 1316	No. 14	..
X 1317	No. 9	..

I.—Fibre particulars and wax content results.

1. Fibre-Length Distribution (Balls Sorter) :—

Mean group-length in eights of an inch.					Percentage.		
					No. 19.	No. 14.	No. 9.
2	..	..	..	..	1.1	1.6	1.2
3	..	..	..	..	3.3	5.4	3.2
4	..	..	..	..	13.6	18.9	10.8
5	..	..	..	..	45.0	41.8	39.0
6	..	..	..	..	29.0	22.1	34.1
7	..	..	..	..	6.7	7.4	8.5
8	..	..	..	..	1.3	2.8	3.2

2. Mean Fibre-Length (Inch) :—

(a) By Balls Sorter	0.65	0.64	0.67
(b) By Baer Sorter	0.67	0.64	0.66

3. Mean Fibre-Weight per (inch millionth of an ounce)

0.350	0.356	0.342
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4. Wax content (per cent.)—

I Test	0.257	0.246	0.218
II Test	0.257	0.241	0.213
Mean	0.257	0.243	0.215

II.—Remarks.

NOTE.—These three selections were raised in the Chittagong Hill Tracts and possess some peculiar features. They are sown in May and harvested in December and receive very heavy rainfall ranging from 90" to 110".

Their ginning percentage is in the neighbourhood of 43 per cent. In these respects they are similar to the Garo Hill cotton of Assam.

Selections Nos. 19 and 9 possess practically the same mean fibre-length as Garo cotton of the 1938-39 season, while No. 14 is slightly shorter in length. All three selections, however, have very nearly the same mean fibre-weight per inch and are each some 11 per cent. finer than the Garo cotton.

Selection No. 9 contains the lowest wax percentage which is the same as that in Garo cotton. The wax contents of Nos. 14 and 19 are respectively 13 per cent. and 20 per cent. higher than that of No. 9. If the feel of these cottons is adjudged from their wax contents, selection No. 9 should be the roughest among them while Nos. 14 and 19 should take second and third place, respectively, in this respect.

STATEMENT III.

Summary of Survey Results for the year 1939-40.

Class.	Ginning percentage.		Devia- tion.	Class.	Lint length.		Devia- tion.
	Fro- quency.	Mean.			Fro- quency.	Mean.	
30 ..	8	42.368	+1.396	13 ..	10	18.418	+1.552
31 ..	2			14 ..	30		
32 ..	5			15 ..	227		
33 ..	35			16 ..	380		
34 ..	33			17 ..	840		
35 ..	80			18 ..	1,757		
36 ..	134			19 ..	1,417		
37 ..	183			20 ..	824		
38 ..	303			21 ..	344		
39 ..	438			22 ..	135		
40 ..	536			23 ..	41		
41 ..	668			24 ..	15		
42 ..	672			25 ..	5		
43 ..	737						
44 ..	626						
45 ..	487						
46 ..	307						
47 ..	232						
48 ..	162						
49 ..	35						
50 ..	154						
51 ..	13						
52 ..	30						
53 ..	38						
54 ..	19						
55 ..	10						
Total 5,947 from 69 mauzas.				Total for 6,025 from 69 mauzas.			

N.B.—Weight of samples below one gramme not considered.

APPENDIX II.

Report on the introduction of long staple cotton in Bengal for the year 1939-40.

When the report for the year 1938-39 was submitted, full details regarding the produces could not be placed before the members of the Committee, as the crop was not completely harvested. We are in a position now to place the same before the Committee. The total produce was over 100 maunds of seed as received by this office. A good deal of seed cotton was retained by the grower and even the quantities so retained were not reported in many cases. Only from the Midnapore Centre we received the whole produce which was about 60 maunds from 42 bighas. This outturn compares favourably with the averages obtained from the low-yielding tracts of cotton in other parts of India. These outturns however will not satisfy Bengal, except perhaps in the districts of Midnapore, Bankura and Birbhum. At the Manikapal Farm (Midnapore) outturn obtained on 3 cottahs of land worked to about 21 maunds of seed cotton per acre. These are Egyptian averages—the best in the world for cotton.

At Naogaon (Rajshahi) on individual bighas 5 maunds 30 seers of outturn was reported upon. Cooch Behar also on large areas reported the same outturn per bigha.

A little over 70 maunds of seed was obtained last year, of which 24 maunds were given to the centres, over 9 maunds to Government Farms and about 28 maunds to private growers.

From our experience of last two years and in view of the fact that the cultivators have to face difficulties for weeding and intercultural operations on cotton during the months of July and August, we propose to find out suitable mixtures with cotton. For the present we would recommend groundnut as a suitable mixture in between rows of cotton.

The results of the cotton centres for the year 1939-40 are very disappointing. This is mainly due to the fact that heavy continuous rains prevailed during the months of July and August and (2) that there were unprecedented cyclonic storms during the early week of August. In many cases especially at Bankura and Mymensingh the plots were actually submerged and remained so for a pretty long period. The drainage system was everywhere defective and the crop suffered seriously as a result. At the Mainamati Centre (Comilla) the crop was seriously set back by the prevalence of sand storms during early August due to which the crop was affected by wilt. At Midnapore the crop was neglected by the grower after the weather affected the crop seriously during the months of July and August due to heavy rains and storms. At Chumakhali (Berhampore) the crop apart from weather suffered considerably due to the fact that the grower was an absentee. Although this year, the weather was unfavourable for the crop throughout Bengal, satisfactory results are reported upon from Rangpur, Krishnagar and parts of Fuleswar and Dhanguri (Midnapore). As regards Farms, Krishnagar and Berhampore are good. Burirhat and Rangpur are fair, Rajshahi bad and from other places reports have not yet been

received. About 233 bighas were put under cotton in the 6 centres. About 125 bighas are still under the crop. About 16 to 20 maunds of produce are expected from the centres. It will be extremely difficult, therefore, to raise from the centres the seed requirements of 6 cotton centres to be put under cotton during the year 1940-41, unless all the produce from all other available sources is pooled in. For a few years also it may be advisable and necessary to collect cotton wherever grown in Bengal, and arrange for direct payments. The Secretary and the millowners must co-operate for prompt action, otherwise no responsible good growers would be forthcoming.

APPENDIX III.

Next year's programme of work.

From our experience of the last two years, it must be said that the present system of compensation must be immediately discontinued, as under this system, it has been found that the growers become positively negligent and there is no co-operation between the cotton demonstrators and growers. The present cotton demonstrators, except perhaps one or two are found practically irresponsible and unsuited for the task. Even ordinary graduates who possess better sense of responsibility and who can conciliate both growers and executive officers would be more suited. The overhead charges also would not be heavy as science graduates are now-a-days available on a monthly pay of say Rs. 40 to Rs. 50. I recommend to the Committee (1) that quality instead of quantity should be aimed at and that there should not be any rigidity for arranging 50 bighas in a centre; (2) that willing growers having suitable sites should be selected with the condition that their produce would be sold at best market rates and (3) that Government may be requested to pay the grower 10 per cent. money value over the actual value of produce as determined and paid by millowners in lieu of compensation as at present given. Incidentally I beg to point out here that the amount of compensation given last year was Rs. 1,593 and that the compensation recommended this year comes to about Rs. 1,600.

In some papers again I find that prizes are being offered to cotton growers on certain conditions, this too I believe is premature and would put us in difficulties in matter of getting the required quantity of seed.

APPENDIX IV.

The manurial scheme for the multiplication of Dacca No. 1.

The manurial scheme for the multiplication of Dacca No. 1 cotton has been administratively approved by Government but no provision of funds has yet been made. Arrangements, therefore, would be made to multiply the seed through private growers till funds are provided for.

APPENDIX V.

*Proceedings of the meeting of the Bengal Cotton Sub-Committee held
at Writers' Buildings on Monday, the 4th March 1940.*

PRESENT:

1. Mr. M. Carbery, D.S.O., M.C., M.A., B.Sc., I.A.S., Director of Agriculture, Bengal—*Chairman*.
2. Mr. Bankim Behari Mandal, M.L.A.
3. Rai Sahib Kirit Bhusan Das, M.L.A.
4. Khan Bahadur Maulvi Alfazuddin Ahmad, M.L.A.
5. Mr. Girija Prasanna Chakrabarty, Representative, Dhakeswari Cotton Mills.
6. Mr. Brajmohan Bagri, Representative, Kesoram Cotton Mills.
7. Mr. D. N. Choudhuri, Representative, Bengal Millowners' Association.
8. Mr. S. Bhattacharjee, Secretary, Bengal Millowners' Association.
9. Mr. Sarada Charan Chakravarty, Representing the Dhakeswari Cotton Mills.
10. Mr. S. G. Sharangapani, Second Economic Botanist to the Government of Bengal.

(1) Minutes of last meeting approved.

(2) The Second Economic Botanist's report on the introduction of long staple cotton in Bengal for the year 1939-40 was discussed by the members and approved.

(3) As regards the next year's (1940-41) programme of work, as the system of giving compensation to the growers has not been as successful as was expected, after considerable discussion it was agreed by the members that in future an increase of 10 per cent. over the market value should be given to the growers instead. Most of the members present agreed that this system would be an allurements for the growers to improve the quality of their crop.

The Chairman pointed out that the present agricultural demonstrators are not competent to tackle the cotton growers and stressed the necessity for trained staff in this respect. He suggested and the members agreed that an officer of Class I—Subordinate Agricultural Service be deputed to the Punjab for training in cotton cultivation for a period of one year.

The Chairman pointed out the difficulties in supervision by the Departmental Officers owing to the fact that at present the centres are situated far from the District Agricultural Officer's headquarters and some of them are not easily accessible. The Director of Agriculture, Bengal, suggested that this year the centres should be selected near the headquarters of the District Agricultural Officers so

that they can be visited by Deputy Directors of Agriculture and Experts when they are on tour, and this was agreed to by the members.

(4) As regards the manurial scheme for the multiplication of Dacca No. 1 cotton, the Director of Agriculture, Bengal, pointed out that money for this has been asked for in this year's budget and it is now for the members of the Legislature to see that this is passed.

(5) At the meeting it was pointed out that there are no official members from Bengal on the Indian Central Cotton Committee. The Sub-Committee strongly recommended that one official member should be appointed preferably the Director of Agriculture, Bengal.

(6) It was agreed that the member representing Bengal in the Indian Central Cotton Committee may be an ex-officio member on the Bengal Cotton Sub-Committee.

(7) It was agreed that the next meeting of the Committee should be held in May.

APPENDIX VI.

Variety.	Replications.	Per cent. moisture	Per cent. oil on dry basis.	Iodine value.	Refractive Index.
		Varies from—	Varies from—	Varies from—	Varies from—
P. 12 ..	1 to 10	2.9 to 8.22 ..	34.1 to 37.0 ..	161.4 to 167.0	1.4695 to 1.4715.
P. 17 ..	1 to 10	2.88 to 5.25	39.33 to 42.12	177.2 to 182.0	1.469 to 1.4705
P. 31 ..	1 to 10	3.38 to 6.1	36.56 to 41.16	174.4 to 178.8	1.4705 to 1.4715
P. 63 ..	1 to 10	2.7 to 5.01	37.5 to 40.95	170.5 to 177.0	1.4695 to 1.471
B. 16 ..	1 to 10	3.7 to 5.6	38.9 to 42.0	162.0 to 170.9	1.470 to 1.471
B. 17 ..	1 to 10	3.96 to 5.15	37.7 to 41.15	166.0 to 173.8	1.469 to 1.4705
B. 26 ..	1 to 10	2.69 to 5.82	38.36 to 41.9	172.4 to 178.2	1.470 to 1.471
B. 28 ..	1 to 10	2.8 to 4.6	36.5 to 39.81	172.0 to 274.9	1.469 to 1.4705
B. 58 ..	1 to 10	2.3 to 5.5	40.6 to 43.95	175.0 to 180.9	1.4695 to 1.4706
B. 61 ..	1 to 10	2.0 to 5.2	40.0 to 43.33	164.6 to 170.0	1.470 to 1.471
B. 62 ..	1 to 10	2.22 to 5.8	35.08 to 39.6	175.0 to 182.3	1.470 to 1.4705
B. 66 ..	1 to 10	3.71 to 4.87	34.55 to 40.74	158.5 to 163.6	1.469 to 1.470
PH. 6 ..	1 to 10	3.5 to 6.27	40.28 to 42.54	179.0 to 184.3	1.4700 to 1.472
PH. 52 ..	1 to 10	3.37 to 4.75	41.8 to 43.65	177.4 to 183.0	1.4710 to 1.472
PH. 75 ..	1 to 10	3.08 to 5.66	38.43 to 40.0	165.0 to 168.0	1.468 to 1.469
PH. 76 ..	1 to 10	2.13 to 5.17	39.47 to 43.08	178.1 to 184.5	1.4710 to 1.472
PH. 79 ..	1 to 10	2.75 to 5.75	39.08 to 42.6	175.0 to 183.5	1.4710 to 1.472
PH. 85 ..	1 to 10	3.78 to 7.03	38.38 to 43.65	178.2 to 184.7	1.4705 to 1.4715
PH. 90 ..	1 to 10	2.35 to 4.57	39.3 to 42.66	178.0 to 184.5	1.4700 to 1.4705
PH. 71 ..	1 to 10	3.6 to 6.57	38.0 to 40.0	176.0 to 180.0	1.4710 to 1.4715

APPENDIX VIA.

Replication No.				Percentage moisture.	Percentage oil.	Iodine value.	Refractive Index.
Type	65	..	..	3.64	42.56	181.2	
E. B.	3	..	..	4.07	38.9	183.7	
	55F	..	..	3.88	39.2	182.8	
CP	43	..	..	4.2	38.6	183.7	
P	101	..	..	3.0	42.76	186.0	
B	49	..	..	4.43	42.66	182.0	
P	66	..	..	3.18	43.89	184.1	

Annual Report of the Agricultural Chemist, Bengal, for 1939-40.

Charge.—I was in charge of the office of the Agricultural Chemist, Bengal, Cigar-making Section, Dacca Farm, and the Government Tobacco Farm, Rangpur, throughout the year under report. The two Superintendents of Agriculture in charge of Sugarcane and Tobacco who were so long attached to this section were transferred and placed under the Deputy Directors of Agriculture, Western and Northern Circles.

Staff.—The staff consisted of—

Mr. S. M. Patwari, m.sc., Assistant Agricultural Chemist, Bengal.

Mr. S. C. Rakshit, b.sc., Assistant to the Agricultural Chemist, Bengal.

Mr. N. K. Nandy, m.sc., Assistant to the Agricultural Chemist, Bengal.

Mr. S. B. Sen, b.sc., Assistant to the Agricultural Chemist, Bengal.

Mr. A. Quader, m.sc., Dairy Chemist under the Agricultural Chemist, Bengal (appointed since 4th September 1939).

Mr. M. N. Chakladar, m.sc., Physical Assistant to the Agricultural Chemist, Bengal (appointed since 20th January 1940).

Babu I. M. Das, Fieldman.

Maulvi A. Sahid, Fieldman (officiating since 15th November 1939, *vice* A. Karim promoted as Overseer, Dacca Farm. Babu Amalananda Kundu worked as officiating Fieldman previous to Maulvi A. Sahid).

Mr. M. N. Chakladar continued to work as Physical Chemist under the Imperial Council of Agricultural Research Scheme. He was given a substantive appointment as Physical Assistant and next transferred to his post under the Imperial Council of Agricultural Research with effect from the date of his appointment (20th January 1940).

Babu S. C. Chakraborty, m.sc., was appointed as Officiating Physical Assistant with effect from the 18th March 1940, *vice* Babu M. N. Chakladar transferred.

Mr. A. Quader worked as Officiating Assistant, *vice* Mr. I. Chatterjee appointed as the Physiological Chemist, Bengal, under the Imperial Council of Agricultural Research Scheme. He was then appointed as the Dairy Chemist from 4th September 1939. Since then the post held by Mr. I. Chatterjee has remained vacant.

Maulvi Wahidul Islam, m.sc., worked temporarily for about 6 months in leave vacancies.

Leave.—Mr. S. C. Rakshit was on leave from the 23rd April to 22nd June 1939. Mr. N. K. Nandi was on leave from the 1st June to 30th September 1939. Mr. A. Quader was on leave from the 21st August to 26th August 1939.

Tour.—I was on tour for 62 days in connection with the inspection of farms and attendance at the meetings of the Imperial Council of Agricultural Research.

The Assistant Agricultural Chemist, Bengal, was on tour for 15 days to work as Polling Officer and for collection of soil profiles, etc.

Mr. S. C. Rakshit was on tour for 22 days mainly in connection with the examination of sugarcane samples. Mr. S. B. Sen was on tour for 29 days mainly for the collection of samples of silt carried by the river Padma and for the examination of sugarcane samples. Mr. A. Quader was on tour for 27 days mainly for the examination of Kasch soils in the Cox's Bazar subdivision, Chittagong.

Sugarcane.—*Weather conditions.*—The season was on the whole a favourable one though the rainfall was heavy and distribution rather abnormal. Total rainfall (January to December 1939) was 89.2 inches as against 69.2 inches normal. Favourable rains in June permitted a vigorous growth. Excessive rainfall in July and August (50 inches against 24 inches normal) interfered greatly with the cultural operations and checked the growth considerably. September showers were helpful. Weather was cyclonic in August and October which caused a certain amount of damage to the crop by lodging. A great havoc was done to sugarcane this year by the outbreak of red-rot in an epidemic form in the flooded tracts of Birbhum and Murshidabad. *Pyrilla* and white fly, two serious pests of sugarcane, also took a heavy toll in the districts of Dinajpur and Jalpaiguri.

Distribution of cuttings of improved varieties of canes.—There was a heavy demand of cuttings during the year and the resources of the Government Farms were taxed to the utmost limit and even then the supply could not be made fully to satisfy the demand. The supply of cuttings from the Dacca Farm alone amounted to 132,500. A little over 2 lakhs of cuttings were supplied from the District Farms in addition to the supply of 186 maunds of whole canes as seeds. Forty-one thousands cuttings were distributed to Union Board Farms and demonstration centres, besides a supply of 157,000 cuttings of Co.213 to Union Board Farms, etc., in the districts of Faridpur and Comilla which was made from local purchase. Mention may be made of the following parties to whom supply was made:—

- (1) S. K. Acharya Choudhury, Muktagacha, Mymensingh—Co.213.
- (2) Rai Bahadur R. K. Sen of the Burdwan Raj Estate—Co.213 and 421.
- (3) Jatindra Nath Kundu, Rajshahi—Co.421.
- (4) Manager, Patiya Tea Company—Co.213 and 407.
- (5) F. Mursland, Jalpaiguri—Co.281 and 508.
- (6) Manager, Anjuman Tea Company—Co.281 and 508.
- (7) Director, Martola Farm, Rajshahi—Co.421.
- (8) Setabganj Sugar Mills—Co.421.

- (9) North Bengal Sugar Mills, Gopalpur, Rajshahi—Co.213, 508 and 419.
- (10) Nawab Musharruf Hossain, Jalpaiguri—Co.213, 331, 421 and 508.
- (11) Viswa Bharati, Birbhum—Co.508, 281 and 421.
- (12) Rahut Estate, Jalpaiguri—Co.331.
- (13) Babu Nanilal Ghose, 24-Parganas—Co.331.
- (14) Babu Jagadish Chandra Saha, Dacca—Co.213 and 331.

Variety trial of sugarcane.—Altogether 23 varieties consisting of 5 early, 6 mid-season and 12 late variety canes were examined at the Dacca Farm. The results of examination have been given in the Appendices I A-C. and those of the District Farms in the Appendix II.

Gur boiling tests of the promising varieties in the various farms.—The results of the gur boiling tests have been summarised in the following Tables IA and IB.

TABLE IA.
Gur boiling tests of the canes in the Government Farms (early varieties).

Serial No.	Farms.	Date of boiling.	Co. 281		Ratio Cane to Gur.	Date of boiling.	Co. 281		Ratio Cane to Gur.	Date of boiling.	Co. 281		Ratio Cane to Gur.	Co. 508		Ratio Cane to Gur.
			Yield in maunds per acre.				Yield in maunds per acre.				Yield in maunds per acre.					
			Cane.	Gur.			Cane.	Gur.			Cane.	Gur.		Cane.	Gur.	
1	Dacca	..	4-12-1939	431.8	50.0	9.6 : 1	6-12-1939	427.6	43.0	9.9 : 1	8-12-1939	515.1	50.0	10.3 : 1		
2	Rajshahi	..	20-12-1939	725.0	87.0	8.3 : 1	21-12-1939	579.0	68.0	8.5 : 1	20-12-1939	755.0	91.0	8.3 : 1		
3	Berhampore	..	14-12-1939	666.6	71.2	9.3 : 1	12-12-1939	512.8	52.7	9.7 : 1	13-12-1939	500.0	53.1	9.4 : 1		
4	Chinsurah	..	16-12-1939	761.3	62.4	12.2 : 1	13-12-1939	757.7	73.0	10.3 : 1	26-12-1939	797.3	76.0	10.4 : 1		
5	Pabna	..	20-12-1939	416.7	38.9	10.7 : 1	..	..	..	..	..	..	..	..
6	Dhaka/pur	..	31-12-1939	367.0	37.4	9.7 : 1	..	..	..	..	29-12-1939	532.0	51.7	10.2 : 1
7	Rangpur	..	15-12-1939	864.0	78.3	11.0 : 1	13-12-1939	360.0	42.4	8.4 : 1	19-12-1939	432.0	39.1	11.0 : 1		
8	Malda	..	..	..	..	..	28-3-1940	590.0	38.5	12.9 : 1	20-2-1940	180.0	17.0	10.5 : 1
9	Comilla	..	..	..	..	..	..	..	..	..	18-1-1940	..	56.5	..
10	Jalpaiguri	..	..	472.2	44.4	10.6 : 1	..	..	..	..	..	..	..	..
11	Mymensingh	..	30-11-1939	627.4	68.3	9.1 : 1	2-12-1939	432.4	55.6	8.6 : 1	9-12-1939	475.8	55.3	8.6 : 1		
12	Bogra	..	29-12-1939	1,078.0	96.5	11.1 : 1	29-12-1939	418.5	37.5	11.1 : 1	2-1-1940	583.8	53.4	10.9 : 1		

TABLE IB.

Gur boiling tests of the canes in the Government Farms mid and late varieties.

Serial No.	Farms.	Date of boiling.	Co. 421.		Ratio Cane to Gur.	Date of boiling.	Co. 213.		Ratio Cane to Gur.	Date of boiling.	Co. 331.		Ratio Cane to Gur.
			Yield in maunds per acre.				Yield in maunds per acre.				Yield in maunds per acre.		
			Cane.	Gur.			Cane.	Gur.			Cane.	Gur.	
1	Dacca	16-3-1940	1,010.1	80.4	12.5 : 1	14-3-1940	700.8	66.0	10.6 : 1	17-3-1940	853.2	90.2	9.4 : 1
2	Rajshahi	29-2-1940	1,147.0	143.3	8.0 : 1	29-2-1940	780.0	97.5	8.0 : 1	28-2-1940	1,099	123.6	8.9 : 1
3	Berhampore	21-2-1940	454.5	53.2	8.5 : 1	20-2-1940	515.4	62.3	8.3 : 1	16-3-1940	740.7	85.2	8.7 : 1
4	Chinsurah	7-2-1940	1,258.4	88.0	14.3 : 1	13-1-1940	675.7	55.9	12.0 : 1	8-2-1940	990.0	98.4	10.0 : 1
5	Pabna	10-2-1940	730.6	77.8	9.3 : 1	30-1-1940	611.9	65.0	9.2 : 1	15-2-1940	996.0	92.0	10.5 : 1
6	Dinajpur	13-2-1940	1,108.0	114.3	9.6 : 1	25-2-1940	870.0	87.0	10.0 : 1	4-3-1940	930.0	73.9	12.6 : 1
7	Rangpur	21-2-1940	532.0	48.0	11.5 : 1	26-2-1940	456.0	43.5	10.5 : 1	23-2-1940	612.0	50.0	12.2 : 1
8	Malla	21-2-1940	520.0	45.0	11.5 : 1	23-2-1940	448.0	33.3	13.4 : 1	28-2-1940	594.0	42.8	12.8 : 1
9	Cumilla	30-1-1940	..	89.6	..	8-2-1940	..	58.5	..	6-2-1940	..	64.2	..
10	Jalpaiguri	..	927.1	85.0	10.9 : 1	..	720.8	60.1	11.9 : 1	..	1,066.0	85.7	12.4 : 1
11	Mymensingh	..	..	..	..	..	..	..	..	..	..	..	..
12	Bogra	21-2-1940	778.1	82.6	9.4 : 1	16-2-1940	640.0	61.5	10.4 : 1	25-2-1940	573.4	55.1	10.4 : 1

Early variety canes.—An examination of the table shows the wide range of variations in the outturn of cane and gur as also of the quality of the juice in the various farms. The two varieties Co.281 and 508 behaved differently in the different farms. One excelled over the other in certain farms while reverse was the case in certain other farms. Thus at Berhampore and Rangpur Co.281 proved to be the superior cane while at Chinsurah and Rajshahi Co.508 gave the higher yield. Rajshahi returned the best quality juice with Co.281 and 508.

Mid-season and late variety canes.—Here too, there were wide fluctuations in outturn and quality. Excepting in very few farms both Co.421 and 331 did better than the standard cane Co.213 but they behaved differently in the different farms. As in the case of the early variety canes, Rajshahi topped the list regarding the quality of canes.

It is remarkable that Chinsurah canes were systematically poor in their quality of juice. Almost similar was the case with Rangpur, Malda and Jalpaiguri canes.

Pithiness in Co. canes.—A hollow core occurs inside all Coimbatore canes. It differs from cane to cane and in the same cane from internode to internode. In spite of this variation different varieties are characterised by different pithiness. An attempt was made to have an idea of the pithiness indirectly from the density measurement. The greater the pithiness in a cane less is its density. 5 canes of different girths of a particular variety were taken for the measurement of density. The observational data of 5 different varieties of Co. canes were given below:—

TABLE II.

Density measurement of different varieties of Coimbatore Canes.

Co. 213.			Co. 281.			Co. 331.			Co. 527.			Co. 421.		
Length (c.m.).	Weight (g.m.).	Density.	Length.	Weight.	Density.	Length.	Weight.	Density.	Length.	Weight.	Density.	Length.	Weight.	Density.
210	602	1.041	240	1,248	1.104	240	945	1.025	270	1,500	1.014	300	2,080	1.085
240	1,075	1.078	240	1,123	1.080	300	1,445	1.005	270	1,400	1.027	270	1,700	1.030
240	908	1.056	240	1,030	1.103	240	1,238	1.076	270	1,215	1.047	300	1,350	1.024
240	1,212	1.104	210	755	1.102	270	940	1.068	240	710	1.028	240	1,018	1.135
210	660	1.137	180	473	1.061	210	550	1.023	240	770	1.045	240	745	1.029
Range of Density variations			1.040—1.104			1.005—1.076			1.014—1.047			1.030—1.135		
Average Density			1.086			1.039			1.032			1.061		

An examination of the table shows that of the recommended canes Co. 331 and 421 are less dense or in other words more pithy than the standard cane Co. 213. Co. 281, s on a par with Co. 213 in point of pithiness.

Demonstration of Chakki-Gur manufacture.—A demonstration on the manufacture of chakki-gur was carried out this year in nine selected centres in three circles at a total cost of Rs. 755-13-3 only. The centres of work were as follows:—

A.—Northern Circle:—

- (1) Barsail (district Rajshahi)—from 23rd February 1940 to 3rd March 1940.
- (2) Pirganj (district Dinajpur)—from 5th March 1940 to 14th March 1940.
- (3) Ataikulla (district Pabna)—from 17th March 1940 to 26th March 1940.

B.—Eastern Circle:—

- (1) Netrakona (district Mymensingh)—from 23rd February 1940 to 3rd March 1940.
- (2) Pangsha (district Faridpur)—from 5th March 1940 to 14th March 1940.
- (3) Barkanta (district Tippera)—from 16th March 1940 to 25th March 1940.

C.—Western Circle:—

- (1) Manikapal (district Midnapore)—from 23rd February 1940 to 3rd March 1940.
- (2) Tangra (district Nadia)—from 5th March 1940 to 15th March 1940.
- (3) Godgachi (district Jessore)—from 17th March 1940 to 26th March 1940.

The demonstration was attended by a large number of people at each centre and the technique of the preparation of chakki-gur was explained to them. 10 to 12 maunds of cane were crushed every day at each centre of work and the juice boiled into gur and then moulded in the form of cakes known as "Chakki-Gur". Moulding was done both in wooden frames and also in earth. The cakes set hard with attractive colour everywhere. The work was highly appreciated by the cultivators.

Tobacco.—The season was a very bad one for tobacco. The unusually heavy rains in October caused serious damage to the tender seedlings. The transplantation was delayed. The crop also suffered much from *Agrotis* and leaf curl. Rains again in February and March during the harvesting period added much to the difficulties in curing and told upon the quality of the cured produce.

At the Dacca Farm 36 varieties of tobacco were grown. They consisted of 25 varieties for pure line culture and 11 varieties for multiplication. The flue curing of cigarette tobacco was discontinued from this year at the Dacca Farm. It was, however, done at the Rangpur Tobacco Farm. The tobacco Development Officer of the Imperial Council of Agricultural Research who had an opportunity to examine the flue cured cigarette leaves of the Virginian type at Rangpur thought

that the leaves had the elements of good qualities in them but these masked by defects in cultural operations especially with respect to manuring and topping.

Seed supply.—The distribution of improved seeds was continued as before. A little over 2,000 tolas of seeds were distributed during the year of which Matihari seeds alone accounted for nearly 1,900 tolas.

Cigar-making Section.—Four cigar rollers worked throughout the year. About 38 maunds of tobacco leaves were turned into hand made cigars. As before, Sumatra, Manilla, Pennsylvania, Bhengi and Ohio were the types mainly used for cigar-making. The cigar rollers attended 2 exhibitions and spent 24 days giving demonstration of cigar-making. The cigars produced at the Dacca Farm continued to be as popular as before, the sale proceeds of cigars amounted to Rs. 1,517-0-9 as against Rs. 981-12-3 last year.

Work on soil.—(i) *Effect of lime on the native potash of the Dacca red soil.*—The work was continued using the principles of base exchange to determine the total exchangeable potash and the water soluble potash in the soil. 25 grams of soil were taken for each determination. For the total exchangeable potash *William's Method* was made use of. The results obtained were as follows:—

Per 100 grams of soil.		
Total exchangeable potash	...	8.3 m.g.
Water soluble potash	...	4.1 m.g.

It was observed last year that the potash concentration in the lime treated soil began to decrease with the lapse of time and the phenomenon was explained thus—The H ions are more easily displaced than K ions with the addition of lime. The liberated H ions act upon the iron, aluminium and silica of the soil and ultimately form insoluble compounds with potassium whereby the concentration of the soluble potash decreases. The fixation of potash may also be explained in other ways. In order to determine the nature of fixation equal quantities of two lime treated soils—

- (i) soil freshly treated with lime, and
- (ii) soil that was treated with the same quantity of lime and kept moistened with water for some time,

were taken and shaken up with water as before. After the separation of the supernatant liquid soil samples were taken in each case for the estimation of total exchangeable potash and water soluble potash. As the Assistant in charge of the work was on leave very little progress could be made with the work. The experimental data are very limited and they are as follows:—

Lime per 100 grams soil.		Per 100 grams soil.	
		Total ex- changeable potash.	Water soluble potash.
1.2 grams	.. Soil freshly treated with lime	10.0 mgm.	6.4 mgm.
	.. Soil previously treated with lime	10.0 "	4.1 "
0.8 grams	.. Soil freshly treated with lime	8.4 "	4.8 "
	.. Soil previously treated with lime	10.0 "	3.8 "

It will be seen that in the case of water soluble potash previous treatment with lime brings less potash into solution whereas in the case of the total exchangeable potash, the difference is small in one case and nil in the other. The work will be continued.

Work on Kasch soil in Cox's Bazar subdivision, Chittagong.—

(i) *Kasch* is a kind of poisonous secretion appearing in the coastal forest lands of Chittagong which were reclaimed and brought under cultivation. These lands used to grow very good crops of paddy but are now going out of cultivation owing to the appearance of *Kasch* whereby productiveness has gone down very considerably and in some cases the lands have become absolutely barren.

The matter was brought to the notice of the Department in the cold weather of 1935. In 1935 I had an opportunity to see many such areas in Badarkhali, Maheskhal and Gomatali. The affected soils contain peaty materials at various stages of decomposition dotted with yellow and red deposits and the depth at which these peaty materials occur scarcely exceeds 2 feet from the surface. These lands occur in low-lying areas which suffer from defects in drainage.

Improvement of the drainage of the place by cutting deep drains right through the affected area with the provision of sluice boxes at one of their ends for effective removal of the sub-soil water was our first recommendation. Very positive results have been reported from the Badarkhali Co-operative Colony. The Assistant Registrar of the Co-operative Societies, Chittagong-Noakhali Division, has reported as follows:—

“The Co-operative Colonists of Badarkhali have been very much benefited on the improvement of some *Kasch*-affected areas by adopting the method suggested by your Experts. The result of 3 such plots is placed below:—

Plot No.	Area affected by Kasch (acres).	Yield per acre before treatment.	Yield per acre year after year since treatment began.	Yield per acre of adjacent unaffected plots.
48	6.89	20 Aris ..	1936 .. 44 Aris 1937 .. 67 " 1938 .. 66 " 1939 .. 114 "	125 Aris.
28	2.32	15 "	1936 .. 23 " 1937 .. 37 " 1938 .. 69 " 1939 .. 84 "	90 "
31	1.39	Nil.	1936 .. Nil. 1937 .. 10 " 1938 .. 16 " 1939 .. 25 "	45 "

* N. B.—100 Aris of paddy = 22½ maunds.

(ii) In the foregoing an account has been given of the ameliorative effect on *Kasch* by improvement in drainage. A further attempt was made to try chemical means of amelioration. As the affected soils contained much undecomposed vegetable matters it was assumed that the toxic substance might be an intermediate product of slow vegetable decomposition which if oxidised might turn to be harmless to the growth of paddy. Thus in addition to substances containing food materials for micro-organisms like cowdung, nicifos and bone and substances containing minor elements like Borax and MnO_2 substances helping oxidation like copper sulphate and lime were given trial.

A large quantity of *Kasch* soils from the worst affected area in Badarkhali were brought down to Dacca along with some good soils. The analytical results of examination of these soils are given below:—

				Good soil.	Kasch soil.
Moisture%	..	..	..	4.44	9.31
Loss on ignition %	..	..	..	9.82	17.03
Total K_2O %	..	..	..	1.05	1.40
Total CaO %	..	..	..	0.49	0.46
Total P_2O_5 %	..	..	..	0.130	0.101
Nitrogen %	..	..	..	0.107	0.280
Acidity (PH)	..	..	..	6.0	1.9

N. B.—Ferrous iron estimated as Fe_2O_3 in aqueous solution (1 : 2) in *Kasch* soils = 0.025%.

To rectify the acidity, the *Kasch* soils (PH-1.9) were treated with a heavy dose of lime at 250 maunds per acre and altogether 9 treatments were tried in the pots and they were as follows:—

- (i) Control.
- (ii) Lime.
- (iii) Lime + Bone (5 grams per pot).
- (iv) Lime + Nicifos (2 grams per pot).
- (v) Lime + Cowdung (50 grams).
- (vi) Lime + Bone + $CuSO_4$ (Higher dose) — 4 grams per pot.
- (vii) Lime + Bone + $CuSO_4$ (Smaller dose) — 2 grams per pot.
- (viii) Lime + Bone + MnO_2 (4 grams per pot).
- (ix) Lime + Bone + Boraf (2 grams per pot).

Each treatment had 5 replications and each pot contained about 16 lbs. of soil. Paddy tried was a Badarkhali local known as Ladum.

Seedlings raised elsewhere in good soil from Badarkhali were transplanted on 15th August 1939, but they failed to grow in spite of 3 separate attempts. Sprouted seeds were next tried; they grew in all the treated pots but after some time they behaved differently in the different series of treatments. The performance of the plants has been summed up in the Table III.

TABLE III.

Performance of paddy in the differently treated Kasch soils.

Treatments.		Number of pots in which plants survived.	Condition of growth of the plants.	Remarks.
(i) Control	.. ..	..	All died	Poor. Indifferent.
(ii) Lime	.. ..	1	Medium	Indifferent. Medium
(iii) Lime + Bone	.. ..	3	Very poor—(1) Different—(2)	Medium. Fair.
(iv) Lime + Nicifos	.. ..	5	Fair (2) Medium—(1) Very poor—(2).	Fair. Luxuriant.
(v) Lime + Cowdung	.. ..	3	Luxuriant—(2). Indifferent—(1).	
(vi) Lime + Bone + CuSO_4 (High)	.. ..	5	Luxuriant—(4). Poor—(1).	
(vii) Lime + Bone + CuSO_4 (small)	.. ..	4	Luxuriant—(1). Poor—(3).	
(viii) Lime + Bone + MnO_2	.. ..	Nil	All died.	
(ix) Lime + Bone + Borax	.. ..	1	Fair.	

Remarks.—When the plants grew up an inch of water was allowed to stand in the pots.

Measurement of PH of the supernatant liquid as also of the soil pot by pot was done but it did not give any helpful clue.

It was observed that a white layer of salt deposited in almost all the pots just above the liquid line and that there was much difference in colour and taste of the supernatant water as well as the surface soil layer of the different pots. Supernatant liquid looked brownish and the taste was somewhat bitter like that of a solution of iron salt. The water in the CuSO_4 treated pots was however clear and slightly blackish without the bitter taste. It was observed that almost all the pots except the CuSO_4 ones developed a brownish yellow film on the surface of the liquid. The supernatant liquid in these pots was found to contain a good quantity of ferrous salt dissolved in it. The brownish yellow film was evidently formed by the oxidation of the ferrous into ferric salt which settled on the soil surface. A part of the oxidised salt was probably in semi-collodal or collodal solution which imparted its coloration to the liquid. The liquid in the uSO_4 treated pots when examined for the ferrous salt gave negative results. But the water when allowed to percolate downwards through the soil gave positive reaction as in

the other pots showing that the soil inside still contained ferrous salt.

The results so far obtained give indications that toxicity is most probably due to an overdose of soluble ferrous salts in the *kasch* soils and that CuSO_4 has an ameliorating effect in that it somehow keeps under check the harmful effect of ferrous salt either by promoting its oxidation or by forming insoluble double compounds. The work will be carried on next year.

(iii) With regard to the question of the de-afforestation of Rampur and Charandwip blocks of the Chakaria Sunderban Reserve Forest the Collector, Chittagong, wanted the Department to report (1) as accurately as possible the acreage in the Badarkhali Colony which has so far become affected by the phenomenon of *Kasch* and (2) an opinion as to the likelihood or otherwise of the Rampur and Charandwip blocks of the Chakaria Sunderban Reserve Forest becoming affected in this way after reclamation.

A report was duly submitted which may be summed up as follows:—

Badarkhali Colonisation Area.

Total area—3,910·40 acres.

Divided into 3 blocks—

Block I—Area inside embankment—492 acres.

Block II—Area inside embankment—1,418 acres.

Block III—Area inside embankment—1,600 acres.

Culturable area (assessed) within the blocks.

Block I—433·68 acres.

Block II—1,094·25 acres. 1,527·93 acres

Block III— 1,200·00 acres (approximate).

Area affected by *Kasch* within the culturable area.

Area affected but grows paddy.			Area badly affected barren and does not grow paddy.	Total affected area (approximate).
Acres			Acres.	Acres.
Block I—5	..	..	8	13
Block II—35	..	..	12	47
			Total	60

Remarks.—*Kasch*-affected area (not assessed) in Block II under grazing—80·33 acres.

On reclamation *Kasch* is bound to occur in the Rampur and Charandwip blocks and the proportion of such land is not likely to be higher than that at Badarkhali. *Kasch* is amenable to treatment and capable of improvement by proper drainage.

Examination of soils.—(i) Soils from the Manikapal Farm, Lalgarh, Midnapore and the proposed site of the Chittagong District Farm.

Samples of soils were examined both chemically and mechanically and the results of examination are given in the Appendix III.

Manikapal Farm.—The soil is specially poor in nitrogen and organic matter. Potash, lime and phosphate are present in moderate amounts. Physically the soil is a light sandy loam with a freely drained subsoil.

Chittagong Farm site.—The soil is poor in organic matter. Potash is present in moderate amount but lime and phosphate are on the low side. The soil is of a loamy nature.

(ii) *Soils from Sunti Low, Dacca Farm.*—The area was sampled plot by plot and the soil samples examined both chemically and mechanically. For results see Appendix IV.

(iii) *Soils from Meggitts plot, Dacca Farm.*—A large number of samples were examined for carbon and nitrogen contents before and after ploughing in of organic matter in the form of aus paddy straw. The analytical data are given in the Appendix V.

The carbon content does not show any improvement with the incorporation of organic materials. Carbon is quickly lost by oxidation in the Dacca Farm soils.

Evaluation of the silt carried by the rivers in Bengal.—Bengal is intersected by several big rivers like the Padma, Brahmaputra, Megna, Tista, etc. They carry in their water silt which has got a high manurial value. The amount and quality of the silt vary in the different rivers. A beginning was made to evaluate the silt of these rivers. The river Padma was the first to be tried. Samples of water from the surface were collected from the river between Bohor and Goalundo at 5 different places—(Bohor, Tarpassa, Bhagyakul, Tepakhola and Goalundo) in the course of steamer journey between Narayanganj and Goalundo. Three collections were made in the months of June, July and August last.

The first collection was made on the 19th June 1939. Total quantity of solid present both in solution and suspension near Bohor was 0.022 grams at Tarpassa 0.032 grams and Tepakhola 0.050 grams per 100 c.c. of water. Quantity of solid in solution was practically the same in water from all the above places. It varied from 0.006 to 0.008 grams per 100 c.c. of water. The quantity remained practically the same throughout the season.

The second collection was made on the 15th July 1939. On that date the samples were collected from five places, and quantities (solid in solution and suspension) of silt varied from 0.0194 grams at Bohor to 0.076 grams at Tepakhola per 100 c.c. of water.

The third or the last collection was made on the 7th August 1939. Quantities of solid in solution and suspension that time at Bohor was 0.0288 grams and at Tarpassa 0.065 grams per 100 c.c. of water. The quantities at other places varied between these two figures. At Bohor the quantity was less than those at other places. This may be due to the fact that, at Bohor the Padma meets the Megna and Megna water contains less silt and so the Padma water has been diluted with the Megna water. For quantities of silt present in the Padma water at different times, see Table IV.

TABLE IV.

Quantities of silt present in the Padma water at different times.

Place of collection.	19th June 1939.		
	Total solid in solution and suspension in 100 c.c. water.	Total solid in solution in 100 c.c. water.	Total solid in suspension per 100 c.c.
1	2	3	4
Bohor	·022	·0075	·0145
Tarpasa	·032	·0056	·0264
Bhagyakul .. ..	..	..	..
Tepakbola	·050	·0075	·0425
Goalundo .. ..	..	..	..

Place of collection.	15th July 1939.		
	Total solid in solution and suspension in 100 c.c. water.	Total solid in solution in 100 c.c. water.	Total solid in suspension per 100 c.c.
1	5	6	7
Bohor	·0194	·0055	·0139
Tarpasa	·0608	·0065	·0543
Bhagyakul	·0654	·0065	·0589
Tepakbola	·0760	·0070	·0690
Goalundo	·0592	·0062	·5300

Place of collection.	7th August 1939.		
	Total solid in solution and suspension in 100 c.c. water.	Total solid in solution in 100 c.c. water.	Total solid in suspension per 100 c.c.
1	8	9	10
Bohor	·0288	·0210	·0088
Tarpasa	·0658	·0080	·0578
Bhagyakul	·062	·0085	·0535
Tepakbola	·0502	·0080	·0422
Goalundo	·0174	·0070	·0404

Quantity of silt obtained from water was not sufficient for mechanical or chemical analysis. To get sufficient quantity of silt, arrangement was made to collect large quantity of water from one place. Accordingly on 8th August 1939 sixteen tins of water were collected from the river near Tarpassa and these tins were brought to Dacca in a boat.

The silt was allowed to settle for two days and supernatant water syphoned off. In this way solid in solution and a small quantity of silt in suspension water were removed. It was practically a very difficult work to evaporate such a huge quantity of water; and complete settling of the silt was not possible in a few days and hence the above procedure was adopted. Mud from the bottoms of each tin was removed in a basin and evaporated to dryness and dried to a temperature of 105°C. and weight taken. It was 142.88 grams. The volume of water collected in 16 tins was 215,000 c.c. Therefore the quantity of silt per 100 c.c. of water was .0664 grams.

The silt thus obtained was examined chemically and mechanically. The following results were obtained:—

TABLE V.

Analytical results of Padma silt.

	Mechanical analysis.		Chemical analysis per cent. moisture free basis.
Moisture	.. 1.32	Loss on Ignition	.. 3.26
Organic carbon	.. 0.9856	Acid insoluble Residue	.. 74.025
Coarse sand	.. 0.18	Fe_2O_3	.. 7.142
Fine sand	.. 26.32	Al_2O_3	.. 9.667
Silt	.. 50.0	P_2O_5	.. 0.141
Clay	.. 18.75	K_2O	.. 1.309
Loss on solution	.. 1.40	CaO	.. 1.260
Carbon/Nitrogen	.. 12.35	Mn_2O_4	.. 0.050
		MgO	.. 0.905
		Nitrogen	.. 0.0798

Great difficulty was experienced to make collections of water samples in the course of ordinary steamer journeys. It was not only difficult but unsatisfactory too. The necessity of a Government launch for the collection of water samples was keenly felt. Perhaps it would not be difficult in future to arrange for such a launch for a week or so and then only the work could be carried on. The comparative valuation of the silt carried by the different rivers in Bengal would no doubt be highly interesting.

Paddy Nutrition (Pot culture).—The work under report is a continuation of the previous year's work on paddy nutrition to see the residual effect of bone and lime applied to the Dacca red laterite soil last year in which 5 lime treatments were cross treated with 4 bone treatments.

The contents of the pots of the last year's experiment were removed and after being thoroughly mixed were replaced in them. A general dressing of ammonium sulphate at 1 md. of N_2 per acre was given to each of the pots.

The results obtained are given in the table VI and represented in the graphs 1 and 2.

TABLE VI.

RESIDUAL EFFECT OF LIME AND BONE ON PADDY (INDRASAIL).

Average yield of paddy and straw in grams.

(Average of 5.)

Straw.

	B ₀	B ₁	B ₂	B ₃	Remarks.	
					<i>Lime.</i>	
L ₀	..	0.30	2.27	2.37	2.65	L ₀ Nil.
L ₁	..	Dead	2.00	2.46	2.23	L ₁ 0.025% of soil.
L ₂	..	0.40	1.87	2.69	2.27	L ₂ 0.1% of soil.
L ₃	..	0.36	3.94	3.48	3.12	L ₃ 0.2% of soil.
L ₄	..	0.76	2.92	3.05	3.57	L ₄ 0.3% of soil.

Bone.

Paddy (grains).

B₀ Nil.
B₁ 0.025% of soil.
B₂ 0.050% of soil.
B₃ 0.075% of soil.

	B ₀	B ₁	B ₂	B ₃	
L ₀	..	0.13	1.59	1.55	1.75
L ₁	..	Dead	1.23	1.95	1.35
L ₂	..	0.03	1.21	1.75	1.14
L ₃	..	0.21	3.10	2.38	1.91
L ₄	..	0.49	2.03	2.09	2.05

Key :—As above.

The residual effect of lime alone in small or high dose is practically nil; with bone the residual effect is marked. The least dose of bone has done the best. Higher doses of lime (L₃ and L₄) in combination with bone (B₁) have done better than the smaller doses L₁ and L₂.

Work on Linseed and Mustard.—(i) Linseed oil is extensively used in the manufacture of paints, varnishes, etc., and is an article of international demand. It is mainly valued for its drying qualities. In order to see whether this drying quality is a hereditary factor depending on the inherent property of the seeds or an environmental one depending on climatic and soil conditions, work has been started this year by collecting a large number of samples from different parts of India as well as from Bengal. They have been analysed for their oil content and iodine value. The latter is a measure of the drying property; the greater the iodine value the greater is the drying power and the better the quality. They have been made over to the Second Economic Botanist, Bengal, for growing them in this province and sending samples next year for the examination when it will be possible to say whether or not the quality of linseeds is determined more by hereditary or by environment. The analytical results of 30 samples of linseed are given in the Appendix VI. It will be seen that in P.H. 52 and P.H. 6 Bengal has got 2 seeds of very high iodine value and good oil content.

(ii) The work on the Physico-chemical constants of mustard seeds R 5 and T 7 have been continued. The seeds have been supplied by the Second Economic Botanist, Bengal, from his experimental plots in

Mymensingh and Pabna having different dates of sowing and harvesting. Altogether 95 samples have been analysed for their oil content, iodine value, saponification value and Refractometer readings. The analytical results of the earliest sown seeds which in fact gives the most yield are summarised separately for Rai 5 and Tory 7 in the Tables VII and VIII against similar data obtained last year.

An examination of these figures reveals the following:—

Rye 5.—Compared with the last year, there is a significant fall in oil content and a rise in Iodine value this year at the Mymensingh Farm. At Pabna the oil content is almost similar but there is a rise in the Iodine value. This year the oil content at the Pabna Farm is significantly more than that at Mymensingh Farm while the Iodine value is almost similar.

TABLE VII.

Oil content and physico-chemical constant of Rye 5.

Laboratory No.	Oil content.	Iodine value.	Saponification value.	Refractometer Index.	Remarks.
36 ..	31.5	109.22	174.11	61.0	Mymensingh Farm. Rabi season, 1938-39.
37 ..	33.5	107.96	133.89	61.0	
38 ..	32.6	108.36	173.89	61.0	
39 ..	26.4	108.87	173.88	61.0	
40 ..	26.0	107.76	174.31	61.0	
Average ..	30.0	108.43	174.01	61.0	
24 ..	35.3	106.86	172.38	61.0	Mymensingh Farm. Rabi season, 1937-38.
26 ..	35.2	104.78	172.86	60.5	
32 ..	34.7	106.41	172.21	60.0	
23 ..	36.0	105.93	172.92	61.0	
27 ..	40.8	105.86	172.33	60.5	
Average ..	36.4	105.97	172.54	60.6	
100 ..	35.9	108.20	171.73	61.0	Pabna Farm. Rabi season, 1938-39.
102 ..	36.1	107.82	172.34	61.0	
103 ..	36.7	107.97	172.68	61.2	
104 ..	38.1	107.61	172.50	61.2	
105 ..	37.1	107.72	172.38	61.0	
Average ..	36.8	107.86	172.32	61.1	
210 ..	35.9	104.04	172.50	61.0	Pabna Farm. Rabi season, 1937-38.
173 ..	35.6	106.99	173.27	61.0	
211 ..	37.7	104.98	172.50	61.0	
201 ..	35.1	105.66	173.10	61.0	
177 ..	38.0	105.67	172.80	61.0	
Average ..	36.5	105.65	172.83	61.0	

TABLE VIII.

Oil content and physico-chemical constant of Tori 7.

Laboratory No.	Oil content.	Iodine value.	Saponification value.	Refraction Index.	Remarks.
56/39 ..	39.1	99.91	173.82	60.0	} Mymensingh Farm. Rabi season, 1938-39.
57/39 ..	41.1	99.57	173.45	60.0	
58/39 ..	40.2	99.43	173.75	60.0	
59/39 ..	39.0	99.30	173.19	60.0	
60/39 ..	38.0	100.0	171.76	60.0	
Average ..	39.5	99.64	173.19	60.0	
39 ..	41.6	97.0	171.86	60.0	} Mymensingh Farm. Rabi season, 1937-38.
38 ..	41.6	97.67	171.81	60.0	
37 ..	41.7	97.90	171.65	59.5	
36 ..	41.1	97.43	171.07	59.5	
35 ..	38.3	98.22	171.11	59.5	
Average ..	40.9	97.66	171.50	59.7	
106/39 ..	38.9	102.36	172.63	60.0	} Pabna Farm. Rabi season, 1938-39.
107/39 ..	38.5	101.54	172.37	60.0	
108/39 ..	39.3	101.94	171.79	60.0	
109/39 ..	39.1	101.70	172.14	60.0	
110/39 ..	35.2	101.43	171.63	60.0	
Average ..	38.2	101.61	172.11	60.0	
198 ..	39.0	98.42	172.10	60.0	} Pabna Farm. Rabi season, 1937-38.
182 ..	40.8	99.66	174.59	60.0	
200 ..	40.0	98.27	172.35	60.0	
216 ..	40.2	98.01	173.12	60.0	
195 ..	42.9	97.56	172.44	60.0	
Average ..	40.6	98.38	172.92	60.0	

Tori 7.—Compared with the last year there is a light fall in oil content with a slight rise in Iodine value this year at the Mymensingh Farm. At Pabna also the oil content is lower but the Iodine value is higher. This year the oil content at Mymensingh is slightly higher than that at Pabna while the Iodine value is lower.

Work on Milk, Milk Products and Fodder Crops.—A Dairy Research Assistant was appointed during the year under report. The War made it impossible to secure the necessary materials and the work was greatly handicapped. Only such work was done as was possible with the resources already available in the Laboratory. The following work was done:—

The efficacy of formalin as a milk preservative was studied. Complete analysis to determine the changes in the various physico-chemical properties of milk was not possible. Changes in titrable acidity only were observed by adding different doses of formalin to a definite quantity

of samples. The analytical data are tabulated below and represented in the graphs 3 and 4.

TABLE IX.

Formalin added per 10 oz. of milk.						Acidity in terms of lactic acid after an interval of—	
						3 days. Per cent.	15 days. Per cent.
(1)	0.0 c. c.	..	..	..	..	0.84	1.197
(2)	0.4 c. c.	..	..	..	..	0.145	0.430
(3)	0.5 c. c.	..	..	..	..	0.135	0.189
(4)	0.7 c. c.	..	..	..	..	0.155	0.153
(5)	0.8 c. c.	..	..	..	..	0.155	0.153
(6)	1.0 c. c.	..	..	..	..	0.160	0.162
(7)	1.3 c. c.	..	..	..	..	0.167	0.162
(8)	1.5 c. c.	..	..	..	..	0.172	0.207
(9)	2.0 c. c.	..	..	..	..	0.185	0.207
(10)	3.0 c. c.	..	..	..	..	0.205	0.207

The results indicate that there is an optimum quantity of formalin to preserve a definite quantity of milk. Thus 14 to 18 drops of Merck pure formalin (40 per cent. pure) have been found to be suitable per 10 oz. of milk at a temperature between 65° to 70°F.

(ii) *Physico-chemical properties of ghee from cow and buffalo milk.*
—Ghee made by different methods in the Dairy Section and samples were sent for analysis. The analytical data are given in Table X.

TABLE X.

Physico-chemical constants of ghee.

Normal constant (Ag. mark).							
B. R. at 40°c		..	.. 40.5—42.5.				
Moisture		..	.. Not more than 0.5 per cent.				
S. V. (i) Cow		..	.. 222—226.				
(ii) Buffalo		..	.. 223—234.				
Free fatty acid		..	.. Not more than 1.5 per cent.				
Hardness: Hard		M. P. Not less than 34°c (complete fusion).					
Medium hard		M. P. less than 30°c (complete fusion).					
	Texture colour.	Hardness M. P.	Free fatty acid (as oleic acid).	Saponification.	Butyro refractometer reading (40°c).	Moisture.	Remarks.
1. Ghee from sour buffalo cream	Uniformly white with slight yellowish tinge. Not granular.	Hard 36°c	Per cent. 0.086	224.33	43.5	Per cent. 0.19	Clear on melting.
2. Ghee from buffalo butter	Uniformly brown: Pasty with very fine granules.	Hard 34°c	1.101	223.09	44.0	0.17	Ditto.
3. Ghee from fresh cream (cow)	Well defined granules. Granular portion white and fluid portion yellow.	Hard 37°—38°c	0.103	221.57	43.2	0.14	Ditto.
4. Ghee from ripened cream (cow).	Well defined granules. Granular portion white and fluid portion yellow.	Hard 39°—40°c	0.411	221.87	43.2	0.15	Ditto.
5. Ghee from sour cream (mixed)	Fine granules; white with yellow tinge.	Hard 38°—39°c	0.533	219.45	43.0	1.75	On melting it leaves white pasty sediment.

Remarks.—Butyro refractometer reading—slightly above normal.

Saponification value (a) Buffalo—slightly below.

(b) Cow—Almost normal.

N.B.—The observed values are well within the prescribed constants.

Free fatty acid—Normal.

Moisture—Normal excepting sample (5).

(iii) *Feeding values of Aus paddy straw.*—Twelve samples of straw supplied by the Live Stock Expert, Bengal, were examined. The analytical data are given in the Appendix VII.

The figures of D × L ratoon straw are interesting. The protein value 5.5 per cent. is quite high and so also the other extract 2.2 per cent.

Manurial experiments.—The detailed results of the manurial experiments conducted at the Dacca Farm and elsewhere have been given in the Appendices VIII A-I.

(i) *Napier grass manurial experiment at the Dacca Farm.*—Statistical analysis has been done of the results of 3 harvests obtained during the season 1938-39. See Table XI.

TABLE XI.

Field in lbs of Napier grass during the period 10th June 1938—30th May 1939 at the Dacca Farm.

3 harvests on 21st July 1938; 29th October 1938 and 30th May 1939.

Organic manures versus Chemical fertilisers with or without lime.

Lime.							
	A	B	C	D	E	F	G
I	1,024	892	725	807	504	585	793
II	777	712	610	622	463	569	787

	No lime.							Remarks.
	A	B	C	D	E	F	G	Extreme blocks omitted.
I	702	991	843	483	835	549	868	
II	854	841	823	565	381	427	696	

Summary.

Yield in maunds per acre.

	A	B	C	D	E	F	G	Mean.	S. E.	Critical difference.
Lime ..	549	489	410	430	295	352	482	..	..	..
No lime	475	559	508	320	371	298	477	430	8.35	26.0

Per cent.										
Lime ..	128	114	95	101	68	81	111	..	..	..
No lime	110	130	119	74	86	69	110	100	1.94	6.04

Remarks.—Mahalanabis X test satisfied at 1 per cent. level

Key:—

- A—Nielfos.
- B—Ammonium sulphate.
- C—Rape cake.
- D—Farm Yard Manure.
- E—Control.
- F—Rotted water hyacinth.
- G—Ammonium sulphate (1-3rd N₂) Farm Yard Manure (2/3rd N₂).

Manures applied twice in the season on the basis of 100 lbs. N_2 during the full season. Lime applied once in the season at 15 maunds per acre.

Chemical fertilisers Nicifos and Ammonium Sulphate have given significantly increased yields over the organic manures. Addition of lime increases the yield over the control, Nicifos, Farm Yard Manure and water-hyacinth but is positively harmful when used in conjunction with Ammonium Sulphate alone are almost equal in value. Of the organic manures Rape cake is the best followed by Farm Yard Manure plus Ammonium Sulphate. This latter treatment does almost equally well in the presence or absence of lime; the beneficial effect of lime with cowdung is counter-balanced by its depressive effect on Ammonium Sulphate.

(ii) *Complex variety manurial experiment on transplanted paddy at the Chinsurah Farm (Season 1939-40).*—This is a permanent experiment to find out a suitable manure for transplanted paddy under conditions obtaining at the Chinsurah Farm. The detailed figures of yields are given in the Appendix IX, and the results of statistical examination are tabulated below—Table XII:—

TABLE XII.

CHINSURAH FARM—SEASON 1938-39.

Complex variety manurial experiment on transplanted paddy.

Table of yield per treatment in seers paddy (grains).

	L	C	J	B	Manure total.	Remarks.
O ..	76.63	76.81	72.76	45.25	271.45	Main treatment (Manure per acre).
Ni ..	87.76	93.63	78.01	52.00	311.40	
Cd. ..	81.14	81.01	76.01	49.13	287.29	
A.S+S	89.76	89.88	75.01	57.76	312.41	
O ..	73.63	82.77	72.64	43.38	272.42	O—Control.
Ni ..	84.51	90.82	66.63	46.51	288.47	Ni—Nicifos (20lb. N_2 + 20lb. P_2O_5).
Cd. ..	86.44	89.63	72.63	53.39	302.09	Cd—Cowdung 20 lb. N_2 .
A.S+S	85.13	92.13	72.13	52.38	301.77	A.S+S—Ammonium Sulphate 20lbs. N_2 + Superphosphate—20lbs. P_2O_5 .
						Sub-treatment (varieties).
						L—Latisail.
						C—Chinsurah II.
						J—Jhingasail.
						B—Badkalamkati (65).
Variety total.	1,665.00	696.68	585.82	399.80	2347.30	
					Grand total.	

Summary.

Maunds per acre.

	Average manures.	S. E. manures.	Critical difference for manures.
Control ..	28.17	29.92	27.72
Nicifos ..	32.30	34.59	27.12
Cowdung ..	31.43	32.00	27.87
Am. Sulph Super	32.79	34.13	27.59
Average of variety	31.16	32.63	27.47
S. E. for varieties ..	..	..	..
Critical difference for varieties ..	..	..	0.33
			0.90
			..
			..
			..

4 manurial treatments \times 4 varieties of paddy. System of replication—Split plot type with manures as whole plots arranged in Latin Square and varieties of paddy as sub-plots also arranged in Latin Square: 2 replications of the entire system.

All the 3 manures on the whole give better yields than the control. Jhingasail behaves in a peculiar way as it does not respond to the manures. Nicifos and Super plus Ammonium sulphate do equally well in the case Chinsurah II and Latisail varieties whereas it is the latter which gives the better yield in the case of Badkalamkati.

Yields of the different varieties are significantly different from one another. Chinsurah II gives the heaviest yield closely followed by Latisail. Jhingasail is a medium yielder while Badkalamkati is the poorest.

(iii) *Manurial experiment with Nicifos on transplanted paddy (Chinsurah II) at the Chinsurah Farm (Season 1939-40).*—The detailed figures are given in the Appendix X. For statistical examination, see the table below (Table XIII) below:—

TABLE XIII.

NICIFOS MANURIAL EXPERIMENT ON TRANSPLANTED PADDY (CHINSURAH II) AT THE CHINSURAH FARM—SEASON 1939-40.

Actual yield of paddy (grain) in seers.

Each plot—1/10th acre.

Manurial Treatments.

	0 Nl.	1 Nl.	2 Nl.	3 Nl.	Total.	Remarks.
	136.75	141.50	156.38	148.00	582.63	Manures per acre.
	155.75	151.00	140.50	150.75	598.00	0 Nl. = Control.
	135.00	148.63	148.25	156.63	588.51	1 Nl. = 15 lbs. N_2 and 15 lbs. P_2O_5 .
	136.38	132.63	150.00	154.25	579.26	2 Nl. = 30 lbs. N_2 and 30 lbs. P_2O_5 .
Total	563.88	573.76	601.13	609.63	2,348.40	3 Nl. = 45 lbs. N_2 and 45 lbs. P_2O_5 .
					Grand Total.	

Summary.

					Average.	S. E.	Critical difference.
Maunds per acre	35.24	35.86	37.57	38.10	36.70	1.19	4.12
Per cent.	100.00	101.76	106.61	108.12	104.14	3.38	11.69

4 treatments \times 4 replications arranged in a Latin square. Nicifos has not given any significant increase over the control in any of the treatments. This is rather peculiar as in the complex experiment with the same paddy, Nicifos has given decidedly better yields over the control. With Nicifos Chinsurah II has given almost the same yields in the two experiments but in the case of control the yield is decidedly less in the complex experiment. The high yield in the control plot of the simple experiment is due to an abnormally high yield in one plot 155.75 seers as against the average of 136.04 seers in the other 3 plots.

(iv) *Green manure experiment on transplanted paddy at the Suri Farm (Season 1939-40).—*

4 treatments \times 8 replications in randomised blocks.

Each plot—1/40th acre.

Paddy—Bhasamanik (transplanted on 20th/21st August 1939).

Green manures (Sown on 24th June 1939)—Sunnhemp (S), Dhaincha Cowpea, (C) and Control (O).

Applied on the basis of equal dry matter. Detailed figures of yields (grains) are given in the Appendix XI and summarised in the table below (XIV):—

TABLE XIV.

	S	D	C	O	S. E.	Critical difference.	Remarks.
Maunds per acre ..	38.99	42.35	40.38	33.25	1.62	4.75	Mahalanobis X test satisfied at 1 per cent. level.
Per cent. ..	117.20	127.37	121.44	100.00	4.84	14.29	

Green manures significantly increase the yield over the control but amongst themselves there is no significant difference.

(v) *Manurial experiment on Sugarcane at the Dacca Farm (Season 1939-40).—*Plant crop—Co. 213.

6 Treatments \times 6 Replications arranged in Latin Square basis:

Each plot—1/50th acre.

Scheme of manuring:—

General dressing of cowdung at 150 maunds per acre:

Other applications at N_2 —36 lbs. and P_2O_5 —32 lbs. per acre.

A—Cowdung.

B—Cowdung + Steamed Bone.

C—Cowdung + Castor-cake (half in trench and half at first earthing).

D—Cowdung + Castor-cake + Steamed Bone.

E—Cowdung + Nicifos (hot weather application with first earthing).

F—Cowdung + Nicifos (half hot weather and half monsoon application).

The detailed analytical figures are given in the Appendix XII and summarised in the table below (XV):—

TABLE XV.

Stripped canes.	A.	B.	C.	D.	E.	F.	Means.	S. E.	Critical difference.
Maunds per acre	302	349	338	342	315	322	328	16	48
Per cent. ..	100·00	115·56	111·92	113·25	104·30	106·62	108·61	5·30	15·89

Remarks.—No significant difference.

<i>Gur.</i>									
Maunds per acre	32·86	36·93	39·48	36·30	32·14	33·15	35·14	1·99	5·87
Per cent. ..	100·00	112·39	120·15	110·47	97·81	100·88	106·91	6·06	17·86

Remarks.—The treatments do not differ significantly amongst themselves excepting treatment *C* which produces more *gur* than treatments *A*, *E* and *F*.

<i>Sucrose.</i>									
Per cent. ..	20·37	19·89	20·02	20·05	20·11	20·10	20·09	0·15	0·45
Per cent. ..	100·00	97·64	98·28	98·43	98·72	98·68	98·63	0·74	2·21

Remarks.—There is no variation in the sucrose contents due to different treatments. The cowdung treatment gives the most sucrose.

Monthly plantation experiment on sugarcane at the Dacca Farm (Season 1939-40).—Variety—Co. 331.

In order to find out the best time of planting sugarcane under the conditions obtaining at the Dacca Farm an experiment was started in which sugarcane setts were planted on the 15th of every month commencing from November to May. The variety tried was Co.331. The

experimental data are given in the Appendix XIII, and summarised in the following Table XVI:—

TABLE XVI.

MONTHLY PLANTATION EXPERIMENT.

7 Treatments \times 6 Replications arranged on a randomisation basis.

Yield of stripped cane in seers per plot of $1\frac{1}{2}$ Katha.

Variety—Co. 331.

Block.	November.	December.	January.	February.	March.	April.	May.	Total.
I ..	695	619	630	614	711	543	251	4,063
II ..	671	692	615	620	640	620	225	4,083
III ..	787	679	702	691	650	552	241	4,302
IV ..	778	723	721	689	570	624	278	4,374
V ..	589	533	682	552	632	518	269	3,775
VI ..	615	793	684	712	765	588	247	4,404
Total ..	4,135	4,039	4,034	3,869	3,968	3,445	1,511	25,001 Grand total.

Summary.

Mean yield.	November.	December.	January.	February.	March.	April.	May.	S. E.	Critical difference.
Stripped cane— Maunds per acre	689	673	672	645	661	574	252	22.71	65.59 Mahalanabla X test satisfied at *1 per cent. level.
Per cent. ..	100	97.68	97.53	93.61	95.94	83.31	36.57	3.30	9.52

Planted on the months November to March the yield of stripped canes does not show any significant difference. Planting in April decidedly lowers the yield while May plantation is very bad. Considering the damage by white ants and the consequent gap filling that is to be done in November to January plantings it is good for all practical purposes to do the plantings in February and March under the Dacca Farm conditions.

Spacing experiment on Sugarcane.—With the object of finding the most suitable distance between the rows of sugarcane for the maximum production two spacing experiments in paired plots were conducted at the Dacca Farm, one with an early variety cane Co. 381 and the other with a late variety cane Co. 421. 3 feet and $3\frac{1}{2}$ feet distances were

tested against the standard 4 feet distance with the early and late variety canes respectively. The detailed figures of yields are given in the Appendices XIV and XV and summarised in the tables below XVII and XVIII:—

TABLE XVII.

SPACING EXPERIMENT 3 FEET VERSUS 4 FEET.

Arranged in paired plots : 11 replications.

Variety—Co. 381.

Season—1939-40.

Dacca Farm.

Yield of stripped canes in seers per plot.

	Distance between rows.		Remarks.
	4 feet.	3 feet.	
(1)	80	104	
(2)	94	125	
(3)	101	115	3 lines of canes with 4 feet distance and 4 lines of canes with 3 feet distance.
(4)	74	138	
(5)	88	158	Length of each row—13 feet. Area of plot—13 feet × 12 feet.
(6)	89	125	
(7)	109	130	
(8)	111	131	
(9)	123	134	
(10)	130	145	
(11)	103	128	

Summary.

Mean yield of stripped canes.	Spacing.		S. E.	Remarks.
	3 feet.	4 feet.		
Maunds per acre ...	909	699	46.88	Significant at 1 per cent. level.
Per cent. ...	100.00	76.80	5.16	

3 feet spacing gives a significantly higher yield.

TABLE XVIII.

SPACING EXPERIMENT $3\frac{1}{2}$ FEET VERSUS 4 FEET.*In paired plots : 6 Replication.*

Season—1939-40.

Variety—Co. 421.

Dacca Farm.

Yield of stripped canes in seers per plot.

	Distance between rows.		Remarks.
	4 feet.	$3\frac{1}{2}$ feet.	
(1)	1,409	1,582	7 lines of canes with 4 feet distance and 8 lines of canes with $3\frac{1}{2}$ feet distance.
(2)	1,281	1,581	
(3)	1,482	1,541	
(4)	1,308	1,464	Length of each row=68 feet long. Area of plot 68 ft. \times 28 ft.
(5)	1,369	1,580	
(6)	1,451	1,498	

Summary.

Mean yield of stripped canes.	Spacing.		S. E.	Remarks.
	$3\frac{1}{2}$ feet.	4 feet.		
In maunds per acre	881	791	21.88	Significant at 1 per cent. level.
Per cent. ...	100.00	89.78	2.48	

Spacing of $3\frac{1}{2}$ feet gives a significantly heavier yield.

Berseem.—Berseem is a valuable cold weather leguminous crop. It has a high feeding value for cattle which can be fed green or as hay. Attempts have been made to introduce its cultivation in Bengal. It has been tried on a small scale in 5 different places with and without specific bacterial culture received from Loyalpur—Tobacco Farm, Rangpur; Demonstration Farm, Rangpur; Pabna Farm; Bogra Branch Farm and Agricultural Institute Farm, Daulatpur, Khulna. The performance of the crop in the various places is given below.

Tobacco Farm, Rangpur.—Sown on 12th September 1939; germination was quite satisfactory but the crop failed to make any growth.

Demonstration Farm, Rangpur.—Sown on 20th November 1939. Seeds were tried with and without culture. Germination was quite good. In the beginning the crop looked very poor but later on it recovered and made a good progress. No irrigation was done. In 12 weeks the crop grew more than 2 feet high. The treated crop was quite succulent and green and contained a dense mass of root nodules while

the untreated crop was off-colour and had very few root nodules. Only one cutting was taken and the yield calculated per acre as follows:—

Treated—280 maunds (green weight).

Untreated—200 maunds (green weight).

Harvested—on 23rd March 1940.

Bogra Branch Farm.—Sown on 23rd September 1939. Germination was good but the crop failed.

Pabna Farm.—Seeds treated with bacterial culture and sown on 30th September 1939. Germination was good and uniform. Heavy rains in October caused damage in patches. By mid-December crop grew to a height of about 1½ feet without irrigation. It was quite thick and succulent and had copious root nodules. Gave 2 cuttings and the yield calculated per acre was first cut on 16th January 1940—312 maunds (green weight), second cut on 9th March 1940—235 maunds (green weight).

Agricultural Institute, Daulatpur, Khulna.—Seeds were tried with and without culture and was sown on 11th November 1939. Germination was good. Untreated plots grew weedy and the plants were stunted whereas the treated plots made good growth and the weeds were smothered. By mid-January the plants in the treated plots were about 1½ feet high and they grew more than 2 feet high by mid-February. The crop was quite succulent and green looking. The untreated plants on the other hand did not grow more than 1 foot high and they were off-colour. Irrigation was given from time to time (2 shallow irrigations per month on an average). Only one cutting was taken on 18th February 1940 and the yield calculated per acre was 150 maunds (green weight).

Given proper attention to its cultivation I do not see why it would not be possible to grow the crop in Bengal as elsewhere in India. I propose to try it next year in different farms in high lands as also in wet paddy lands.

Future programme of work.—(1) *Soil Survey.*—(a) Examination of *Kasch* soils in the coastal regions of Chittagong will be continued.

(b) Survey of the area covered by the More Irrigation Scheme if required.

(c) *Soil Survey*—Preliminary survey to be done in the district of Dacca—after the appointment of new staff.

(2) Influence of lime on the liberation of potash in red soils—to be continued.

(3) Nutrition of paddy—Pot culture study.

(4) Correlation of plant nutrients with its growth (Mitscherlich's test)—Pot culture.

(5) Studies on the Physico-chemical constants of oil-seeds—Linseed and Mustard: whether hereditary or environmental.

(6) Evaluation of silt carried by the rivers in Bengal.

(7) Fixation of the Physico-chemical standards of milk and milk products in Bengal: (i) Dacca Farm breed and (ii) pure Deshi cows.

(8) Studies on the decomposition of organic materials under Bengal soil conditions.

(9) Sugarcane—critical examination of the varieties.

(10) Manurial experiments in the fields on paddy, sugarcane, mustard, fodder crops, etc.

(11) Flue curing of the cigarette varieties of tobacco at the Tobacco Farm, Rangpur.

(12) Continuation of other works in hand.

Schemes financed by the Imperial Council of Agricultural Research.

I. Animal Nutrition Section, Bengal.—The following work was conducted during the year under report:—

1. *Feeding and digestion experiments.*—(a) Experiment on the feeding values of aman and aus variety of rice straw.

(b) Experiment on the feeding values of wet Aus straw, i.e., immediately after harvest.

(c) Experiment on the feeding values of two pure varieties of Departmental aman rice straw, viz., *Indrasail* and *Iatisail*.

The analysis of the first one (a) have been completed, but the other two have only been partially done.

As in previous experiments aus straw behaved superior to aman straw. It appears however that rice straw contains appreciable amount of oxalate. Preliminary work seems to indicate that aman straw contains more oxalate than aus straw. The presence of oxalate explains why the lime from rice straw is so poorly utilised.

2. The composition and analysis of a large number of local grasses, silage and fodders were carried out.

3. *Investigations on rice by-products.*—A preliminary survey was conducted last year and the points of interest were incorporated in last year's report. Since then the Imperial Council of Agricultural Research was approached for providing two Assistants to carry out analysis and investigations on the various components of rice by-products and also to examine chemical aspects of their phosphorus components which in the form as they exist do not seem to be profitably utilised during feeding. One Assistant was appointed from January 1940 and the other has been appointed from 30th March 1940. Both are at present engaged in doing preliminary work and picking up the technique.

II. Physical Section for the study of soil problems in Bengal.—The work done during the year under report consists of the following:—

1. *Adsorption of water by soil—Behaviour of adsorbed water towards field crops.*—The cause of the discontinuity of the drying curves for soil and other colloidal materials and the different factors influencing the rate of evaporation of soil moisture at different stages have been investigated. It has been found that by carefully following the rate of evaporation it is possible to associate the moisture content of the soil at various concentrations with certain physical properties of the

soil, the most important of which are associated with the colloids on the one hand and the sizes and shapes of the soil particles on the other.

It has been suggested that a soil at its maximum retaining capacity contains:—

- (1) Free surface water;
- (2) Capillary water; and
- (3) Colloidal water or adsorbed water.

The last phase of soil water has been shown to be expressible by the equation $\log (V-H) = -k_1 t + k_2$.

The availability of the soil water to field crops depends upon the proportion in which it is present in the above categories; while the capillary water is capable of free movement in the soil itself and maintains plant life the adsorbed water is in a state of equilibrium with the osmotic pressure of the cell sap and is held by the soil more rigidly and is resistant to the root suction—the suction pressure of the roots is ordinarily balanced by the back pull of the soil. The availability of this water to field crops therefore is a remote possibility. This equilibrium state of the soil moisture marks the wilting point.

The adsorbed water therefore is actually a true measure of the wilting co-efficient of the soil. It has been shown when the moisture content of the soil which is undergoing evaporation is plotted against time the resulting curve marks out two different stages of which the second or the last stage is a straight line. Apparently therefore the soil moisture represented by the straight portion is the adsorbed moisture which is not available to the plants and is the true wilting co-efficient.

The direct determination of the wilting point has not yet been possible but the figures for the wilting point obtained by this method have been compared with those calculated by Schofield's method of PF measurement.

Soils.	Wilting Point.	
	Calculated from PF measurement.	Calculated from evaporation curve.
Dacca	6.5	7.1
Rangpur	4.2	3.7
Rajshahi	6.00	6.04
Birbhum	1.4	1.12
Nadia	...	8.2
Burdwan	...	4.6
Byde land (Agar gaon)	6.67	6.64
Satmajid (Dacca)	6.5	7.21

The close agreement between the two sets of figures points to the validity of the method suggested here.

II. Studies on soil resistance by dynamometer.—With a view to see the influence if any of the different manurial treatments on the resistance offered to the passage of a cultivation implement through the soil. The soil resistance was measured by dynamometer in three different periods October, November and December. It may be mentioned here that the actual resistance offered to the passage of a cultivation implement through the soil from treatment to treatment will be appreciable only when there is no difference in the moisture content of the soil due to the difference in treatment. As a matter of fact in October and November there was no significant difference. The difference in resistance in these two months therefore from plot to plot is solely and wholly due to treatments. In December the variation in resistance was not significant. This is due to the fact that the effect of the manures on the resistance has been marked by the significant difference in the moisture contents from plot to plot. See Table XIX.

TABLE XIX.

Treatments.	October.		November.		December.	
	Resistance in lbs. Average of 4 sub-plots.	Moisture content. Average of 4 sub-plot.	Resistance in lbs. Average of 6 sub-plots.	Moisture content. Average of 6 sub-plots.	Resistance in lbs. Average of 6 sub-plots.	Moisture content. Average of 6 sub-plots.
Bone	207	16.96	198	13.40	180	11.70
Lime and bone	205	16.97	182	12.00	169.1	9.91
Lime, bone and green manure ..	201	15.28	196	12.00	174	9.5
Bone and green manure ..	191	17.66	196	12.56	174	9.36
No manure	194	17.55	166	14.13	180	12.18
Lime	193	15.95	172	13.46	188	8.90
Lime and green manure ..	200	16.9	177	12.60	188	8.57
Green manure	209	17.56	180	14.37	185	10.74

The bone treated plot records the highest draw bar pull (D.B.P.). But the behaviour of the green manured plot appears to be contradictory to what was noticed in a previous year. The D.B.P. of the green manured plot is almost the same as the bone treated plot although the former recorded the lowest pull in the previous year. The D.B.P. of the limed plot is the lowest. The other treatments occupy intermediate positions. The highest resistance in the green manures plot may be due to the fact that the effect of green manure does not persist for more than a year. The green manure which was applied some years back left no effect as far as the reduction of pull is concerned, while the other manures leave residual effect which is reflected in the resistance offered. It may therefore be concluded that lime changes the texture of the soil so as to reduce the pull while bone alone has got reverse effect. The combination of lime with green manure also reduces the pull but it has got no residual effect. The combined effect is decidedly superior to the effect of any individual treatment.

III. Sugarcane Testing Station (Dacca Farm).—Altogether 47 varieties were tried during the year under report. They consisted of:—

	Number of varieties.
1st year of test	... 9
2nd year of test	... 34
3rd year of test	... 1
4th year of test	... 2
Standard cane Co. 213	... 1

Selection from the Testing Station: 6 varieties, viz., Co. 446, 534, 540, 541, Cos. 87 and 127 have been selected for preliminary trial. 20 varieties have been rejected and 21 retained for further observation.

Preliminary test in the Intermediate Block (Dacca Farm).—8 varieties, viz., Co. 213, 326, 445, 453, 511, 529, 532 and 544 were tested of which 3 have been selected, viz., Co. 326, 511 and 529 for final test in the mid-season group. 2 varieties have been rejected and 3 (Co. 453, 544 and the standard cane Co. 213) retained for further observation. For results see Appendix XVI.

New varieties from Coimbatore.—11 varieties, viz., Co. 460—465 and Co. 550—554 have been received this year from Coimbatore and planted in the Cane Testing Station.

GOSTABEHARI PAL,

Agricultural Chemist to the Government of Bengal.

APPENDIX IA
SUGARCANE (EARLY VARIETIES).
Dacca Farm, Season 1939-40.

Serial No.	Name of variety.	Date of analysis.	Sucrose.	Reducing sugar.	Purity.	Total sucrose in cane.	Fibre.	Yield per acre in maunds.		Ratio cane to Gur.
								Cane.	Gur.	
1	Co. 281 ..	2-10-1939	Per cent. 12.51	Per cent. 2.00	Per cent. 80.43	14.46	Per cent. 14.44	481.8	50.0	9.6 : 1
		14-10-1939	13.57	1.92	81.59					
		17-11-1939	18.52	0.76	91.19					
		4-12-1939	21.20	0.66	97.34					
		18-12-1939	21.54	0.34	96.33					
2	Co. 381 ..	2-10-1939	12.72	1.10	84.46	13.90	16.35	427.6	43.0	9.9 : 1
		14-10-1939	15.25	1.13	84.06					
		17-11-1939	18.35	0.31	90.35					
		4-12-1939	19.93	0.48	96.41					
		18-12-1939	20.88	0.40	97.76					
3	Co. 508 ..	2-10-1939	13.56	1.53	84.43	14.50	17.98	515.1	50.0	10.3 : 1
		14-10-1939	14.02	1.48	80.66					
		16-11-1939	19.45	0.22	91.28					
		4-12-1939	19.49	0.14	95.30					
		18-12-1939	20.92	0.22	97.77					
4	Co. 518 ..	2-10-1939	12.15	1.30	80.67	12.9	18.38	498.6	45.0	11.0 : 1
		14-10-1939	12.64	1.30	78.36					
		18-11-1939	17.16	0.74	88.29					
		4-12-1939	20.68	0.54	95.43					
		18-12-1939	20.40	0.16	45.49					
5	Ds. 35 ..	2-10-1939	15.46	0.84	89.31	14.60	15.62	399.5	36.0	11.0 : 1
		14-10-1939	15.25	0.82	86.45					
		18-11-1939	18.36	0.45	92.37					
		4-12-1939	19.68	0.20	95.34					
		18-12-1939	20.23	0.13	96.79					

APPENDIX IB.

SUGARCANE (MID-SEASON VARIETIES).

Dacca Farm, Season 1939-40.

Serial No.	Name of variety.	Date of analysis.	Sucrose.	Reducing sugar.		Purity.	Total sucrose in cane.	Fibre.	Yield per acre in maunds.		Ratio cane to Gur.
				Per cent.	Per cent.				Cane.	Gur.	
1	Co. 213	2-11-1939	Per cent.	Per cent.	Per cent.	}	15.34	15.06	700.8	86.0	10.6 : 1
		9-99	2.88	69.39	84.74						
		19-12-1939	15.56	1.67	89.02						
		15-1-1940	16.73	1.53	90.74						
		9-2-1940	19.42	1.36	92.87						
2	Co. 407	12-3-1940	19.42	0.81		}	16.69	16.35	844.2	74.5	11.3 : 1
		2-11-1939	10.15	2.88	68.42						
		19-12-1939	14.68	1.62	82.38						
		15-1-1940	19.37	1.30	92.30						
		9-2-1940	19.74	1.15	92.89						
3	Co. 313	11-3-1940	21.69	0.64	95.84	}	16.77	16.19	774.6	99.1	7.8 : 1
		2-11-1939	13.94	1.79	80.24						
		19-12-1939	19.69	0.91	91.12						
		15-1-1940	20.75	1.00	93.29						
		3-1-1940	19.52	1.18	91.54						
4	Co. 375	28-1-1940	22.69	0.63	96.02	}	15.93	15.24	695.0	107.8	6.4 : 1
		2-11-1939	14.67	1.79	83.24						
		19-12-1939	19.24	1.10	91.30						
		3-1-1940	21.14	0.84	95.78						
		15-1-1940	21.42	1.15	94.05						
		29-1-1940	21.63	0.83	93.92						

APPENDIX IC.

SUGARCANE (LATE VARIETIES).

Dacca Farm, Season 1939-40.

Serial No.	Name of variety.	Date of analysis.	Sucrose.	Reducing sugar.	Purity.	Total sucrose in cane.	Fibre.	Yield per acre in maunds.		Ratio cane to Gur.
								Cane.	Gur.	
1	Co. 533	5-1-1940	Per cent. 19.98	Per cent. 1.30	Per cent. 91.34	18.44	12.26	673.1	78.0	8.6 : 1
		18-1-1940	21.96	0.64	95.51					
		1-2-1940	21.99	0.93	94.70					
		3-2-1940	23.09	0.57	96.84					
2	Co. 527	5-1-1940	19.10	1.85	89.73	15.94	14.59	871.0	90.5	9.6 : 1
		18-1-1940	20.10	1.44	91.38					
		2-2-1940	20.67	1.36	92.21					
		7-2-1940	20.59	1.00	93.93					
3	Co. 331	5-1-1940	16.68	2.26	86.53	15.02	..	853.2	90.2	9.4 : 1
		18-1-1940	17.20	2.00	86.96					
		10-2-1940	17.06	2.00	87.08					
		4-3-1940	19.43	1.21	91.85					
4	Co. 421	13-3-1940	18.69	1.10	92.69	15.59	14.39	1,010.1	80.4	12.5 : 1
		5-1-1940	15.40	2.73	82.02					
		18-1-1940	15.25	4.33	77.07					
		10-2-1940	16.98	2.33	85.84					
5	Co. 349	4-3-1940	19.45	1.44	90.70	16.34	14.75	920.0	96.7	9.2 : 1
		13-3-1940	19.32	0.93	92.52					
		5-1-1940	15.37	3.71	79.66					
		18-1-1940	16.45	3.46	81.21					
		10-2-1940	19.83	1.30	91.04					
		4-3-1940	20.58	0.63	95.99					
		14-3-1940	20.78	0.29	97.13					

6	H. M. 607	..	..	5-1-1940 18-1-1940 10-2-1940 5-3-1940 14-3-1940	12.62 15.01 14.14 17.37 17.95	3.46 2.88 2.88 1.62 0.93	77.52 82.10 80.52 87.70 90.78	14.36	12.28	699.2	76.5	9.1 : 1
7	Co. 386	..	..	6-1-1940 19-1-1940 3-2-1940 7-2-1940	18.54 19.98 20.03 20.01	1.67 1.04 0.96 0.96	91.25 91.74 93.40 94.97	15.32	13.91	690.4	84.7	8.1 : 1
8	Co. 411	..	..	6-1-1940 19-1-1940 2-2-1940 8-2-1940	17.63 18.10 18.26 18.77	1.08 0.94 0.85 0.45	89.12 91.50 92.38 94.60	15.52	11.20	684.5	74.2	9.2 : 1
9	Co. 419	..	..	6-1-1940 19-1-1940 10-2-1940 5-3-1940 15-3-1940	15.94 17.19 19.16 18.64 20.45	4.00 3.25 2.33 2.00 1.48	78.44 82.87 87.97 87.64 92.41	17.12	10.42	1,020.4	90.9	11.2 : 1
10	Co. 443	..	..	6-1-1940 19-1-1940 10-2-1940 5-3-1940 15-3-1940	17.83 16.70 19.16 18.40 21.52	2.26 2.36 1.57 1.48 0.52	87.76 86.61 92.20 90.76 96.32	17.70	17.97	713.3	65.7	10.8 : 1
11	Co. 444	..	..	6-1-1940 19-1-1940 9-2-1940	17.83 19.56 20.02	1.30 1.33 1.15	92.49 93.11 92.98	16.76	12.35	806.6	93.7	8.6 : 1
12	Co. 523	..	..	6-1-1940 19-1-1940 3-3-1940 8-2-1940	19.42 20.09 19.92 19.43	1.26 1.15 1.21 1.56	91.24 93.30 91.48 91.05	15.33	12.82	928.2	98.5	9.4 : 1

APPENDIX II.

Results of sugarcane juice analysis in the district farms, Session 1939-40.

Serial No. and name of farms.	Co. 231					Co. 331					Co. 508				
	Date of analysis.	Sucrose.	Reducing sugar.	Purity.	Date of analysis.	Sucrose.	Reducing sugar.	Purity.	Date of analysis.	Sucrose.	Reducing sugar.	Purity.	Date of analysis.	Sucrose.	Reducing sugar.
	1	2	3	4	5	6	7	8	9	10	11	12	10	11	12
		Per cent.	Per cent.	Per cent.		Per cent.	Per cent.	Per cent.		Per cent.	Per cent.	Per cent.		Per cent.	Per cent.
1. Mymensingh ..	8-11-1939	13.87	2.26	80.74	8-11-1939	17.47	0.56	89.40	8-11-1939	18.22	0.43	92.70	8-11-1939	18.22	0.43
2. Berhampore ..	29-11-1939	14.65	1.18	86.86	29-11-1939	15.45	0.62	89.64	29-11-1939	16.86	0.71	94.00	29-11-1939	16.86	0.71
3. Krishnagar ..	29-11-1939	15.70	0.96	90.92	29-11-1939	19.14	0.46	93.94	29-11-1939	17.82	0.37	94.40	29-11-1939	17.82	0.37
4. Chinsurah ..	3-12-1939	10.33	1.06	79.44	3-12-1939	19.25	0.104	93.90	3-12-1939	10.79	1.08	79.89	3-12-1939	10.79	1.08
5. Burdwan ..	2-12-1939	20.66	0.104	97.25	2-12-1939	19.80	0.15	95.48	2-12-1939	17.67	0.65	94.29	2-12-1939	17.67	0.65
6. Suri ..	3-12-1939	19.86	0.25	96.89	..	..	..	..	3-12-1939	20.60	0.37	95.80	3-12-1939	20.60	0.37
7. Rajshahi ..	26-11-1939	15.22	0.66	88.31	26-11-1939	17.10	0.39	89.98	26-11-1939	17.21	0.32	92.34	26-11-1939	17.21	0.32
	7-12-1939	18.41	0.19	91.29	7-12-1939	18.41	0.28	91.29	7-12-1939	16.40	0.37	87.86	7-12-1939	16.40	0.37
	23-12-1939	18.90	0.12	95.16	23-12-1939	19.01	0.104	94.42	23-12-1939	18.65	0.18	95.12	23-12-1939	18.65	0.18

APPENDIX II—(contd.).

Results of sugarcane juice analysis in the District Farms, 1939-40.

Serial No. and name of farms.	Co. 518				Co. 331				Co. 421			
	Date of analysis.	Sucrose.	Reducing sugarcane.	Purity.	Date of analysis.	Sucrose.	Reducing sugarcane.	Purity.	Date of analysis.	Sucrose.	Reducing sugarcane.	Purity.
		Per cent.	Per cent.	Per cent.		Per cent.	Per cent.	Per cent.		Per cent.	Per cent.	Per cent.
1. Mymensingh	..	..	..	..	8-11-1939	13.81	1.70	84.53	8-11-1939	10.49	2.40	73.29
	..	..	..	..	24-1-1940	16.12	0.41	92.64	24-1-1940	17.84	0.26	89.67
2. Berhampore	29-11-1939	15.46	0.75	90.23	30-11-1939	12.09	1.85	80.43	30-11-1939	12.73	1.92	78.91
	..	..	..	..	3-2-1940	17.12	0.91	91.09	3-2-1940	18.86	0.47	85.20
3. Krishnagar	..	..	..	..	2-2-1940	13.19	1.57	84.44	2-2-1940	16.14	0.66	93.56
4. Chinsurah	..	..	..	..	2-12-1939	11.24	1.73	82.02	2-12-1939	12.04	1.48	82.06
5. Burdwan	..	..	..	..	21-2-1940	18.45	0.27	96.44	21-2-1940	19.53	0.13	96.02
	..	..	..	..	22-2-1940	19.33	0.82	93.69	22-2-1940	20.23	0.47	96.70
6. Suri	..	..	..	..	22-2-1940	18.16	0.54	95.98	..	..	..	..
7. Rajshahi	26-11-1939	18.12	0.18	92.21	26-11-1939	8.37	2.74	71.20	27-11-1939	14.06	1.23	86.33
	7-12-1939	17.39	0.15	87.97	31-1-1940	13.40	1.18	88.97	31-1-1940	20.04	0.11	97.14
	23-12-1939	19.17	0.104	94.55	15-2-1940	14.45	1.00	85.13	15-2-1940	17.44	0.19	94.50
	..	..	..	..	1-3-1940	17.50	0.48	91.18	2-3-1940	18.89	0.14	92.10
8. Pabna	..	..	..	..	30-1-1940	17.74	0.41	94.30	30-1-1940	18.02	0.40	90.97
9. Bogra	..	..	..	..	6-2-1940	17.97	0.38	94.45	6-2-1940	19.74	0.15	94.95
10. Dinajpur	..	..	..	..	6-2-1940	13.26	0.57	85.54	6-2-1940	13.40	0.54	83.57
	..	..	..	..	8-2-1940	16.03	0.29	93.36	8-2-1940	17.27	0.15	94.30
11. Rangpur	..	..	..	..	7-2-1940	17.02	0.41	93.87	7-2-1940	15.87	0.53	91.05
12. Jalpaiguri	..	..	..	..	7-2-1940	15.70	0.86	87.88	7-2-1940	17.04	0.44	90.36
13. Comilla	..	..	..	..	23-1-1940	12.84	2.00	81.70	23-1-1940	13.88	0.85	84.29 *
14. Faridpur	..	..	..	..	25-1-1940	15.20	0.51	89.23	25-1-1940	14.68	0.51	86.84
15. Madah	..	..	..	..	1-2-1940	16.28	1.00	91.25	1-2-1940	14.82	1.33	88.16

APPENDIX II—(concl'd.).
Results of sugarcane juice analysis in the District Farms, 1929-40.

Serial No. and name of farm.	Co. 386.				Co. 407.				Co. 213.			
	Date of analysis.	Sucrose.	Reducing sugar.	Purity.	Date of analysis.	Sucrose.	Reducing sugar.	Purity.	Date of analysis.	Sucrose.	Reducing sugar.	Purity.
		Per cent.	Per cent.	Per cent.		Per cent.	Per cent.	Per cent.		Per cent.	Per cent.	Per cent.
1. Rajshahi ..	26-11-1939	14.27	0.93	87.30	26-11-1939	12.98	1.26	83.31	26-11-1939	10.14	2.26	74.98
	31-1-1940	10.76	0.12	98.35	31-1-1940	19.36	0.41	94.30	31-1-1940	17.17	0.45	93.31
	..	..	..	..	..	..	..	..	15-2-1940	17.02	0.36	92.42
	4-3-1940	21.35	0.104	94.42	4-3-1940	20.25	0.27	95.91	2-3-1940	18.03	0.36	93.62
2. Berhampur ..	30-11-1939	8.18	2.08	69.42	30-11-1939	8.81	2.60	72.66	30-11-1939	13.10	1.52	81.44
	3-2-1940	16.47	0.94	91.34	3-2-1940	15.51	0.89	91.07	3-2-1940	17.09	0.55	93.49
3. Mymensingh ..	..	..	..	..	..	..	..	..	8-11-1939	15.80	1.15	86.61
4. Maldah ..	..	..	..	..	..	..	..	..	1-2-1940	17.22	0.89	92.93
5. Krishnagar ..	..	..	..	..	..	..	..	..	2-2-1940	16.74	1.00	91.77
6. Suri ..	..	..	..	..	..	..	..	..	22-2-1940	20.36	0.49	97.44
7. Chinsurah ..	..	..	..	..	..	..	..	..	2-12-1939	13.47	1.00	87.34
8. Comilla ..	..	..	..	..	..	..	..	..	23-1-1940	17.15	0.64	92.88
9. Pabna ..	..	..	..	..	..	..	..	..	30-1-1940	17.00	0.42	93.06
10. Dinajpur ..	..	..	..	..	..	..	..	..	6-2-1940	12.78	0.34	81.31
	..	..	..	..	..	..	..	..	8-2-1940	9.78	0.60	76.46
11. Bogra ..	..	..	..	..	..	..	..	..	6-2-1940	16.92	0.50	92.76
12. Jalpalguri ..	..	..	..	..	..	..	..	..	7-2-1940	15.61	0.62	88.66
13. Rangpur ..	..	..	..	..	..	..	..	..	7-2-1940	13.40	0.74	83.44

APPENDIX III.

CHEMICAL ANALYSIS OF SOIL.

Hcl acid extract.

(On moisture free basis.)

	Manikapal, Lalghar and Midnapore.			Chittagong-Pahartall proposed farm site.	
	0°—6°.	6°—12°.	12°—18°.	0°—6°.	6°—12°.
Loss on ignition	2.49	3.12	2.42	2.87	2.77
Insoluble residue	84.45	80.33	82.62	86.81	84.22
K ₂ O	0.70	0.91	0.71	0.73	0.86
CaO	0.71	0.75	0.80	0.33	0.35
MgO	0.59	0.81	0.82	0.68	0.80
Al ₂ O ₃	6.23	8.04	6.84	5.19	6.39
Fe ₂ O ₃	4.38	5.50	5.12	2.92	3.75
Mn ₂ O ₃	0.05	0.05	0.05	0.15	0.15
P ₂ O ₅	0.051	0.059	0.067	0.035	0.026
Nitrogen	0.036	0.034	0.020	0.079	0.056

MECHANICAL ANALYSIS OF SOIL.

International soda method.

	Manikapal, Lalghar and Midnapore.			Pahartall-Chittagong proposed farm site.	
	0°—6°.	6°—12°.	12°—18°.	0°—6°.	6°—12°.
Moisture	2.06	3.10	2.60	3.19	2.84
Coarse sand	0.82	0.63	2.14	0.85	2.39
Fine sand	64.32	55.86	63.04	30.70	33.78
Silt	13.90	18.90	14.75	39.00	39.75
Clay	18.50	21.25	18.25	13.25	17.00
	0.42	0.44	0.42	0.36	0.34

APPENDIX IV.

SUNRI LOW (Dacca Farm).

A. O.'s manual experimental plots.

Chemical analysis : Hot acid extract—calculated on moisture free basis.

Plot No.	3(B ₃ + L).		4(B ₁ + L).		5(Control).		8(B ₃ + L).		9(L).		10(R P).	
	0"—6"	6"—12"	0"—6"	6"—12"	0"—6"	6"—12"	0"—6"	6"—12"	0"—6"	6"—12"	0"—6"	6"—12"
Loss on ignition ..	2.04	2.86	2.29	2.71	2.39	3.68	2.53	2.54	2.47	3.04	2.22	3.44
Acid insoluble residue ..	90.87	86.19	90.73	85.26	88.10	81.96	89.83	84.99	88.63	82.88	89.02	81.60
K ₂ O ..	0.26	0.38	0.23	0.30	0.24	0.61	0.49	0.51	0.50	0.68	0.37	0.65
CaO ..	0.18	0.13	0.19	0.13	0.07	0.08	0.22	0.15	0.20	0.15	0.12	0.09
MgO ..	0.18	0.18	0.12	0.18	0.17	..	0.21	0.22	0.19	0.26	0.18	0.25
Al ₂ O ₃ ..	4.08	6.58	3.89	6.23	5.08	8.69	5.03	6.64	5.09	8.04	4.66	8.32
Fe ₂ O ₃ ..	1.55	2.66	1.81	3.61	2.57	3.87	1.89	3.58	1.99	3.33	2.13	4.26
Mn ₂ O ₄ ..	0.01	0.01	0.02	0.02	0.01	0.04	0.01	0.02	0.02	0.01	0.02	0.06
P ₂ O ₅ ..	0.036	0.025	0.037	0.027	0.043	0.064	0.029	0.030	0.035	0.022	..	0.033
Organic carbon ..	0.58	0.48	0.57	0.43	0.58	0.45	0.65	0.46	0.57	0.47	0.63	0.44
Nitrogen ...	0.060	0.056	0.060	0.057	0.056	0.052	0.066	0.056	0.060	0.062	0.070	0.060
Carbon/Nitrogen ..	9.67	8.59	8.68	7.60	10.32	8.58	9.86	8.21	9.53	7.61	8.98	7.38

MECHANICAL ANALYSIS.

International soda method.

	..	4.70	5.86	1.96	5.52	4.24	4.74	3.08	2.66	2.94	4.32	3.68	5.74
Moisture	..	..	..	..	..	..	..	..	..	..	..	..	..
Coarse sand	..	3.59	3.94	4.09	8.33	3.85	7.48	3.76	8.03	3.87	5.84	4.52	7.91
Fine sand	..	43.92	34.92	49.52	37.83	44.43	36.96	45.83	42.10	46.53	38.33	48.29	36.67
Silt	..	31.25	30.75	28.25	25.50	28.50	23.25	30.25	25.75	28.75	25.25	26.25	23.75
Clay	..	15.75	25.25	16.0	22.75	19.75	28.0	17.25	22.0	17.25	27.0	17.25	26.75
	..	0.45	0.25	0.31	0.31	0.25	0.29	0.31	0.32	0.29	0.28	0.31	0.37

APPENDIX IV—concl'd.

SUNTI LOW (Dacca Farm)—concl'd.

A. C.'s manurial experimental plots.

Chemical analysis: Hcl acid extract—calculated on moisture free basis.

Plot number.	13 (Control).		14 (B ₁).		15 (B ₂).		16 (RP ₁ + L).		17 (B ₃).		18 (Control).	
	0°—6°.	6°—12°.	0°—6°.	6°—12°.	0°—6°.	6°—12°.	0°—6°.	6°—12°.	0°—6°.	6°—12°.	0°—6°.	6°—12°.
Loss on ignition ..	3.12	4.25	2.86	3.43	2.48	3.33	2.96	3.61	2.85	3.43	2.56	3.73
Acid insoluble residue ..	88.28	80.35	88.79	90.63	90.75	85.14	87.24	79.86	89.81	81.55	89.59	81.02
K ₂ O ..	0.51	0.83	0.56	0.69	0.39	0.73	0.49	0.80	0.49	0.89	0.49	0.85
CaO ..	0.05	0.08	0.09	0.07	0.06	0.08	0.31	0.25	0.14	0.15	0.13	0.16
MgO ..	0.19	0.26	0.18	0.21	0.14	0.20	0.18	0.27	0.20	0.27	0.20	0.24
Al ₂ O ₃ ..	5.66	10.93	5.71	7.91	4.44	7.92	5.65	10.68	5.52	9.90	5.12	10.02
Fe ₂ O ₃ ..	1.83	2.73	1.12	1.58	1.14	1.86	2.02	3.21	0.98	2.79	1.25	2.71
Mn ₂ O ₄ ..	0.025	0.025	0.015	0.015	0.001	0.025	0.015	0.050	0.025	0.025	0.015	0.025
P ₂ O ₅ ..	0.032	0.036	0.039	0.032	0.039	0.037	..	0.035	0.047	0.036	0.029	0.040
Organic carbon ..	0.64	0.51	0.64	0.58	0.69	0.54	0.64	0.45	0.56	0.48	0.67	0.45
Nitrogen carbon ..	0.076	0.066	0.078	0.066	0.079	0.064	0.070	0.064	0.063	0.064	0.074	0.083
Nitrogen ..	8.37	7.80	8.23	8.75	8.75	8.37	9.17	7.05	8.89	7.44	9.08	8.40

MECHANICAL ANALYSIS.

International soda method.

Moisture	..	2.27	4.02	3.78	3.34	3.18	3.907	2.53	5.20	6.32	5.54	2.66	5.06
Coarse sand	..	4.01	7.82	3.31	2.97	3.33	3.83	6.62	10.8	3.97	6.12	4.48	5.86
Fine sand	..	45.90	36.28	44.65	36.55	49.59	40.37	45.0	35.16	45.84	35.33	48.10	35.73
Silt	..	25.50	24.0	30.85	29.0	26.50	27.25	24.50	20.40	25.85	24.25	26.25	23.90
Clay	..	19.75	27.0	15.40	25.75	15.50	24.0	19.25	28.0	16.15	28.5	16.75	28.5
		0.26	0.37	0.47	0.30	0.29	0.30	0.37	0.30	0.23	0.26	0.27	0.26

B₁—Bone every year.

B₂—Bone every 2nd year.

B₃—Bone every 3rd year.

RP₁—Rock phosphate every year.

L—Lime every year.

APPENDIX V.

DECOMPOSITION OF ORGANIC MATTER IN DACCA FARM SOILS.

(Meggitt's plot.)

Plot No.	A				B			Remarks.		
	Soils collected on 20th August 1938. Before ploughing in of paddy stubbles.		Soils collected on 9th May 1939. After ploughing in of stubbles.		Soils collected on 14th October 1939. After ploughing in of stubbles.					
	Carbon.	Nitro- gen.	Carbon	Carbon.	Nitro- gen.	Carbon	Carbon.	Nitrogen.	Carbon.	
	Per cent.	Per cent.	Nitro- gen.	Per cent.	Per cent.	Nitro- gen.	Per cent.	Per cent.	Nitrogen.	
1	..	0.672	0.062	10.84	0.623	0.062	10.38	0.626	0.630	9.94
2	..	0.574	0.062	9.26	0.574	0.070	8.20	0.541	0.574	9.41
3	..	0.658	0.073	9.01	0.665	0.094	7.07	0.655	0.644	10.17
4	..	0.602	0.063	9.55	0.574	0.080	7.18	0.633	0.602	10.51
5	..	0.574	0.059	9.73	0.609	0.078	7.81	0.519	0.602	8.62
6	..	0.552	0.052	10.61	0.532	0.076	7.0	0.527	0.532	9.91
7	..	0.593	0.062	9.41	0.630	0.064	9.84	0.569	0.602	9.45
8	..	0.580	0.052	11.15	0.532	0.057	9.33	0.527	0.574	9.18
9	..	0.621	0.067	9.27	0.637	0.071	8.97	0.635	0.658	9.65
10	..	0.007	0.055	11.04	0.574	0.059	9.73	0.558	0.56	9.96

Remarks.—Plot Nos. 1 to 5 paddy plants completely harvested.
 Plot Nos. 6 to 10 tops only harvested and the stubbles ploughed in.
 A—Collection made after ploughing in of paddy stubbles of 1938 crop.
 B—Collection made after ploughing in of paddy stubbles of 1939 crop.

APPENDIX VI.

ANALYTICAL RESULTS OF LINSEEDS.

				Oil content. Petroleum. Ether extraction.	Iodine value. Cold expressed oil.	Number of seed per gram.
1.	Linseed 483 Cawnpore	..	..	40.5	174.86	195
2.	Linseed 1196 Cawnpore	..	..	44.3	170.12	113
3.	Linseed 477 Cawnpore	..	..	38.7	170.64	178
4.	Linseed 11.50 Cawnpore	..	..	43.4	184.91	128
5.	Linseed 1206 Canwpore	..	..	47.5	186.41	104
6.	Linseed 1193 Cawnpore	..	..	44.4	172.37	97
7.	Linseed E. B. 3 Nagpur	..	..	42.4	178.03	124
8.	Linseed 3243 Nagpur	..	..	41.0	173.43	130
9.	Linseed O. S. X. Nagpur	..	..	45.9	181.81	141
10.	Linseed F 55 Nagpur	..	..	41.1	172.80	128
11.	Linseed local Nagpur	..	..	40.00	177.32	187
12.	Linseed 3255 Nagpur	..	..	40.2	174.00	209
13.	Linseed P. H. 52 Dacca	..	..	43.4	188.32	198
14.	Linseed P. H. 6 Dacca	..	..	43.9	189.61	218
15.	Linseed B 26 Dacca	..	..	39.0	176.58	202
16.	Linseed B 63 Dacca	..	..	40.1	177.64	225
17.	Linseed B 61 Dacca	..	..	41.05	171.60	124
18.	Linseed B 66 Dacca	..	..	38.7	165.64	123
19.	Linseed I. S. 2 Indore	..	..	44.2	176.68	133
20.	Linseed I. S. 5 Indore	..	..	45.8	179.80	115
21.	Linseed I. S. 11 Indore	..	..	48.0	183.89	..
22.	Linseed I. S. 65 Indore	..	..	46.5	182.97	..
23.	Linseed Bijapur Poona	..	..	41.7	174.72	..
24.	Linseed Bijapur Poona	..	..	40.2	165.79	..
25.	Linseed Bhigwan	..	..	42.3	177.22	..
26.	Linseed Bijapur Poona	..	..	41.2	168.89	..
27.	Linseed Ahmednagar Poona	..	..	43.2	179.03	..
28.	Linseed Shollapur	..	..	40.2	168.34	..
29.	Linseed Shollapur	..	..	43.6	179.89	..
30.	Linseed Shollapur	..	..	43.6	179.18	..

APPENDIX VII.

Feeding values of Aus paddy straw.

Name of samples.	Nitrogen.	Ether extract.	Ash content.	Silica content.	Crude fibre.	Carbo- hydrate by difference.	Remarks.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	
Kataktara ..	0.53	1.00	18.03	15.72	33.05	30.68	
Kalamgar ..	0.67	1.30	17.09	15.04	28.63	36.26	
	4.22 per cent. protein						
Charnock ..	0.43	1.06	17.50	14.71	31.70	34.61	
Kumari ..	0.60	1.80	18.64	15.37	31.59	31.01	D x L Ratoon straw has very high protein and fat values.
	4.35 per cent. protein						
Larkos 1085	0.44	1.97	20.41	17.17	34.12	25.85	
D x L ..	0.47	0.98	17.19	14.41	32.59	34.38	
Dhalasaita ..	0.48	1.41	18.28	15.47	34.59	29.78	
Marichbati ..	0.62	1.03	20.00	17.56	31.41	28.79	
	3.92 per cent. protein.						
Dharial ..	0.57	1.03	22.31	18.59	31.98	25.52	
D x L Ratoon ..	0.87	2.22	17.50	12.95	31.36	35.09	
	5.51 per cent. protein						
Ranpura ..	0.51	1.17	21.74	19.44	30.95	26.17	
Atbai ..	0.63	1.76	19.85	17.10	34.20	26.37	
	3.97 per cent. protein						

APPENDIX VIIIA.

DACCA FARM—SEASON 1939-40.

West Suit Green Manure plot.

Area of each plot—0·1 acre.

Plan and Yield of Green Manure and Katakara Aus Paddy per plot.

7 treatments × 5 replications.

				N	Green manure in maunds green weight.	Katakara aus paddy in seers
		Green manure in maunds green weight.	Katakara aus paddy in seers.	1. Sunn-hemp ..	3·75	38·00
				2. Control ..	..	46·00
				3. Til ..	8·75	36·00
				4. Cowpea ..	8·75	50·00
				5. Joar ..	3·75	28·40
				6. J. Millet ..	3·75	30·00
				7. Crotolaria ..	3·25	20·00
26. Cowpea ..	3·50	30·00		8. Control ..	..	18·00
27. Crotolaria ..	2·50	34·25		9. Til ..	5·50	9·00
28. Control ..	..	30·00		10. J. Millet ..	3·50	27·00
29. Joar ..	4·00	15·00		11. Cowpea ..	3·25	34·00
30. Sunn-hemp ..	3·00	29·00		12. Crotolaria ..	3·00	30·00
15. Til ..	6·25	26·00		13. Sunn-hemp ..	3·00	34·00
16. J. Millet ..	5·00	29·25		14. Joar ..	5·00	24·00
17. Crotolaria ..	3·00	27·00		31. Cowpea ..	5·50	41·00
18. Til ..	8·50	32·00		32. Control ..	..	46·00
19. J. Millet ..	4·50	50·00		33. Joar ..	7·50	31·00
20. Joar ..	3·50	23·00		34. Til ..	9·00	32·00
21. Sunn-hemp ..	2·25	21·00		35. Crotolaria ..	3·50	20·00
22. Cowpea ..	2·75	30·00		36. J. Millet ..	2·50	12·00
23. Control ..	..	26·50		37. Sunn-hemp ..	2·75	20·00
24. Non-experiment ..	..	..		38. Non-experiment ..	..	..
25. Do. ..	..	..		39. Do. ..	..	..

APPENDIX VIIIB.

DACCA FARM—SEASON 1939-40.

Experimental results of Basu's South plot.

Area of each plot 1/117th of an acre.

Manures—Green manure and lime.

Crop—Kataktara Aus in Kharif and Matikalai in Rabi.

Plan and yield per plot in seers.

	L dug in	L + G. M. dug in	L dug in	Check.	G. M. dug in	Check.
	1	2	3	4	5	6
Kharif paddy ..	0.12	0.25	0.12	1.50	2.12	1.12
Green weight rabi ..	6.0	5.0	2.50	3.0	4.0	1.0

	L on surface.	L + G. M. on surface.	L on surface.	Check.	G. M. on surface.	Check.
	7	8	9	10	11	12
Kharif paddy ..	0.12	0.18	0.06	1.12	1.25	1.0
Green weight rabi ..	4.75	2.0	2.50	2.0	4.0	3.0

Check—Without manure.

L—Lime.

G. M.—Green manure.

APPENDIX VIIIC.

DACCA FARM—SEASON 1939-40.

Experimental Results of Poultry II.

Name of Crop—Kataktara Aus paddy. Area 3 kathas each.

Seeds sown on 19th May 1939. Crop harvested on 17th September 1939.

Manure applied on 9th April 1939.

Plan and yield of paddy per plot in seers.

9 Lime, Bone and C. D. 3.37	6 Lime, Bone and C. D. 3.50	3 Bone and C. D. 9.0	(1) Lime—60 maunds. (2) Bone—3 maunds. (3) Cowdung—300 maunds. Cowdung—600 maunds in the plot No. 9.
8 Lime, Bone and C. D. 3.25	5 Lime and Bone 2.50	2 Bone 3.12	
7 Lime and C. D. 3.75	4 Lime 2.25	1 No manure 1.12	

APPENDIX VIII D.

DACCA FARM—SEASON 1939-40.

Experimental results of Central Mirpur (17-18) plots.

Area of each plot—1/75th of an acre.

Manures—Bonemeal and Kossiophos applied in equal weight basis at 3 mds. per acre.

Crop—Kataktara Aus paddy.

Date of manuring—G. m. on 14th December 1938, Kossiophos and Bone on 19th May 1939.

Date of sowing—19th May 1939.

Date of harvesting—18th September 1939.

Plan and yield per plot in seers.

Check.	Bone.	Check.	Kossio.	Check.	Bone.	Check.	Kossio.	Check.	Bone.	Check.	Kossio.
1	2	3	4	5	6	7	8	9	10	11	12
0.50	1.00	0.50	1.50	0.81	2.00	1.37	1.67	0.75	1.75	1.12	1.75

Kossio.	Check.	Bone.	Check.	Kossio.	Check.	Bone.	Check.	Kossio.	Check.	Bone.	Check.
24	23	22	21	20	19	18	17	16	15	14	13
0.50	0.50	1.25	1.00	1.50	1.25	1.67	2.00	1.87	1.12	0.81	1.00

APPENDIX VIII E.

DACCA FARM —SEASON 1939-40.

North Hazi Low North Experimental Plots.

Area of plot—6 kathas.

Name of crop —Indrasail paddy.

Plan and yield per plot in maund.

W							
	1	2	3	4	5	6	
S	1·0	1·50	1·81	1·43	0·87	1·43	N
	Check.	Nicifos.	Check.	Diammo- phos.	Check.	Nicifos.	
E							

Nicifos applied 110 lbs. per acre.

Diammophos applied 100 lbs. per acre.

Paddy transplanted on 10th August 1939.

Paddy harvested on 15th December 1939

APPENDIX VIII F.

DACCA FARM—SEASON 1939-40.

Experimental results of North Mirpur Juar Plots.

Area of each plot—1/10th of an acre.

Manure applied—40 lbs. of Nitrogen per acre.

Crop—Dhariai Aus paddy.

Manured on 26th June 1939.

Paddy sown on 11th May 1939.

Paddy harvested on 1st September 1939.

Plan and yield per plot in seers.

Check.	Nicifos.	Check.	Nicifos.	Check.	Nicifos.	Check.	Nicifos.	Check.	Nicifos.	Check.
1	2	3	4	5	6	7	8	9	10	11
31·0	40·0	30·0	26·0	40·0	35·0	34·0	38·0	30·0	31·0	25·0

APPENDIX VIII G.

DACCA FARM—SEASON 1939-40.

Experimental results of Meggit's Plot.

Area of each plot—1/8th of an acre.

Manure applied—40 lbs. of Nitrogen per acre.

Crop—Dhariai Aus paddy.

Manured on 26th June 1939.

Date of sowing—12th May 1939.

Date of harvesting 1st September 1939.

Plan and yield per plot in seers.

Ammo-phos.	Nicifos.	Ammonium sulphate.	Castor-cake.	Nitrollm.	Ammo-phos.	Nicifos.	Ammonium sulphate.	Castor-cake.	Nitrollm.
1	2	3	4	5	6	7	8	9	10
36·0	27·0	34·0	55·0	48·0	56·0	35·0	30·0	27·0	24·0

APPENDIX VIII H.

Dacca Farm—Season 1939-40

Experimental results of Hazi Tank Bank South.

Area of each plot—1/180th of an acre.

Crop—Kataktara Aus paddy.

Manure—Superphosphate.

Date of manuring—G.M. on 21st December 1938 and Super on 18th May 1939.

Date of sowing—19th May 1939.

Date of harvesting—15th September 1939.

Plan and yield per plot in chattaks.

												Treatments.
												(A) Niclos 0 Superphos.
												(B) Niclos 1 Superphos.
												(C) Niclos 2 Superphos.
												(D) Niclos 3 Superphos.
												(E) Niclos 4 Superphos.
												Dose per plot—
												Niclos—235.3 grams.
												Superphos (Single)—
												111.1 grams.
0 0 2 5E	0 0 4 6A	0 0 4 15C	0 0 4 16D	0 0 8 17A	0 0 2 18E	0 0 2 19C	0 0 2 20B	0 0 1 21A	0 0 1 22D	0 0 2 23A	0 0 2 24C	46A
0 0 3 4B	0 0 4 7E	0 0 8 14D	0 0 2 17A	0 0 2 18E	0 0 2 19C	0 0 2 20B	0 0 1 21A	0 0 1 22D	0 0 2 23A	0 0 2 24C	0 0 1 47C	48E
0 0 3 3D	0 0 4 8C	0 0 2 13B	0 0 2 18E	0 0 2 19C	0 0 2 20B	0 0 1 21A	0 0 1 22D	0 0 2 23A	0 0 2 24C	0 0 1 47C	0 0 1 48E	49D
0 0 4 2A	0 0 1 9B	0 0 2 12E	0 0 2 19C	0 0 2 20B	0 0 1 21A	0 0 1 22D	0 0 2 23A	0 0 2 24C	0 0 1 47C	0 0 1 48E	0 0 1 49D	50B
0 0 3 1C	0 0 2 10D	0 0 1 11A	0 0 2 20B	0 0 1 21A	0 0 1 22D	0 0 2 23A	0 0 2 24C	0 0 1 47C	0 0 1 48E	0 0 1 49D	0 0 1 50B	

APPENDIX VIII-I. YIELD OF NAPIER GRASS, DACCA FARM—SEASON 1939-40.

(In lbs. per plot of 1/50th acre.)

With Lime.

Blocks.	A	B	C	D	E	F	G		
							F	G	
I	334	297	268	211	100	223		235	Period—30th October 1939—30th May 1939. Harvested on 30th May 1939. Manuring on 2nd November 1939.
II	304	272	241	155	182	183		202	
III	330	252	192	211	129	112		170	
IV	239	190	194	172	141	164		159	
I	648	612	576	478	314	390		541	Period 1st June 1939—18th July 1939. Harvested on 18th July 1939. Manuring on 1st June 1939.
II	680	684	641	353	282	363		639	
III	734	631	567	489	264	377		602	
IV	457	559	514	422	320	320		645	
I	340	318	367	410	301	337		339	Period 19th July 1939—12th October 1939. Harvested on 12th October 1939. Manuring on
II	376	325	345	363	219	354		398	
III	320	276	305	362	245	299		351	
IV	255	287	260	322	200	285		290	
I	96	86	84	70	61	64		61	Period 13th October 1939—27th February 1940. Harvested on 27th February 1940. Manuring on
II	110	82	66	54	28	66		63	
III	130	95	83	68	30	46		45	
IV	81	90	55	50	30	55		45	

A—Nilfos.
B—Ammonium Sulphate.
C—Rape cake.
D—Farm Yard Manure.
E—Control.
F—Rotted Water Hyacinth.
G—Ammonium Sulphate (1/3 N₂ in May).
Farm Yard Manure (2/3 N₂ in October).

APPENDIX VIII. I—concd.

Without Lime.

Blocks.	A	B	C	D	E	F	G	
I	329	389	282	163	131	153	222	Period 30th October 1938—30th May 1939. Harvested on 30th May 1939. Manuring on 2nd November 1938.
II	255	316	301	141	325	153	233	
III	241	273	242	192	173	242	116	
IV	254	182	215	168	124	168	177	
I	550	583	532	315	168	200	457	Period 1st June 1939—18th July 1939. Harvested on 18th July 1939. Manuring on 1st June 1939.
II	471	657	577	248	413	245	519	
III	482	527	485	375	172	306	278	
IV	525	431	406	305	230	327	447	
I	255	223	261	245	145	170	250	Period 19th July 1939—12th October 1939. Harvested on 12th October 1939. Manuring on
II	230	305	280	165	250	208	275	
III	220	231	220	268	125	260	175	
IV	205	188	180	210	145	190	245	
I	110	93	70	60	20	40	56	Period 13th October 1939—27th February 1940. Harvested on 27th February 1940. Manuring on
II	90	95	85	30	69	20	40	
III	83	81	47	52	31	34	23	
IV	93	70	68	60	50	62	70	

APPENDIX IX.

RESULT OF THE COMPLEX VARIETY MANURIAL EXPERIMENTS ON TRANSPLANTED PADDY AT THE
CHINSURA FARM—SEASON 1939-40.

Area of each sub-plot—1/60th of an acre.

Lay-out Main treatment (Manures).

I	O	Ni	CD	AS+S
II	CD	AS+S	Ni	O
III	Ni	O	AS+S	CD
IV	AS+S	CD	O	Ni
V	AS+S	CD	O	Ni
VI	O	Ni	CD	AS+S
VII	CD	AS+S	Ni	O
VIII	Ni	O	AS+S	CD

O=Control.

Ni=Nitrofa.

CD=Cowdung.

AS+S=Ammonium Sulphate+Super-phosphate.

Lay-out Sub-treatments (varieties).

I	2	1	4	3	2	1	3	4	2	1	3	1	4	3	2
II	4	3	2	1	3	4	2	1	3	1	2	4	3	2	1
III	1	4	3	2	1	3	4	2	1	3	4	2	1	3	2
IV	3	2	1	4	1	2	4	3	4	2	3	1	2	1	4
V	2	1	3	4	1	3	4	2	1	2	3	4	1	4	2
VI	1	4	2	3	2	1	3	4	3	1	4	2	3	1	4
VII	4	3	1	2	4	2	1	3	4	3	2	1	2	3	1
VIII	3	2	4	1	3	4	2	1	2	4	1	3	3	1	4

1=Chinsura II.

2=Lalsal.

3=Radkalankati.

4=Jhingasal.

Yield of paddy in seers per plot.

I	19.88	18.25	19.0	11.50	21.88	23.75	13.75	20.13	19.63	19.0	19.35	11.38	19.38	18.13	10.75	20.38
II	19.63	12.5	20.25	18.75	16.63	19.5	23.25	21.5	11.40	22.75	21.13	21.0	12.25	13.75	20.56	18.75
III	23.0	19.13	12.5	23.5	17.13	10.75	18.75	20.0	24.25	15.88	19.0	24.25	10.0	11.75	19.88	21.5
IV	14.5	21.88	24.75	18.38	21.38	21.38	18.38	13.5	17.88	18.0	10.75	19.25	21.25	24.13	17.75	11.75
V	20.75	23.25	12.25	18.88	25.13	14.38	19.88	22.0	18.13	16.0	8.25	17.0	25.19	16.25	21.88	12.75
VI	21.88	18.63	18.88	12.0	20.19	22.25	11.75	18.75	13.25	10.5	18.25	19.25	18.75	21.0	13.0	22.38
VII	15.75	12.13	22.5	22.69	16.75	20.5	23.0	14.88	16.38	11.13	19.94	20.25	18.0	10.88	19.13	17.63
VIII	10.88	22.5	15.25	22.88	12.25	19.38	29.75	23.63	22.88	17.75	23.50	12.25	13.63	22.5	18.75	22.5

APPENDIX X.

CHINSURA FARM.

Result of the Nicifos Experiment carried on paddy plots during the year 1939-40.

† Number of replications.		Plot reference—		Area of each plot—1/10th of an acre.		Variety of paddy—Aman Chinsura II.										
		A 9—12		c d												
		Control Treatment No. 4.		Number of plots.		Treatment No. I. Nicifos II—15 lbs. N and 15 lbs. P ₂ O ₅ per acre.		Number of plots.		Treatment No. II. Nicifos II—30 lbs. N and 30 lbs. P ₂ O ₅ per acre.		Number of plots.		Treatment No. III. Nicifos II—45 lbs. N and 45 lbs. P ₂ O ₅ per acre.		
						Paddy.				Straw.				Paddy.		Straw.
		Md.	Sr.	Ch.	Md.	Sr.	Ch.	Md.	Sr.	Ch.	Md.	Sr.	Ch.	Md.	Sr.	Ch.
I	..	2	3 16 12	3 20 0	1	3 21 6	4 5 6	4	3 20 8	4 8 0	3	3 30 12	4 3 8			
II	..	5	3 15 0	3 5 6	6	3 28 10	3 23 8	7	3 36 0	3 33 4	8	3 34 4	3 35 4			
III	..	10	3 16 6	3 3 8	9	3 12 10	3 3 0	12	3 28 4	3 3 4	11	3 36 10	3 31 8			
IV	..	13	3 35 12	3 22 6	14	3 31 0	3 36 8	15	3 36 6	4 21 4	16	3 28 0	3 27 0			
Average outturn per plot.	..	..	3 20 15½	3 12 13	..	3 23 7	3 27 1½	..	3 30 4½	3 36 7	..	3 32 7	3 34 5			
Average outturn per acre.	..	..	35 9 11	38 8 2	..	35 34 6	36 30 15	..	37 22 13	39 4 6	..	38 4 6	38 23 2			

APPENDIX XI.

PLAN OF GREEN MANURING EXPERIMENT AT SURI FARM DURING THE YEAR
1939-40.*Yield in seers per plot.*

Block " G "

		East.				S = Sunn-hemp. D = Dhalicha. C = Cowpea. X = Nil.
Same level	$\frac{21}{G}$	S 49.25	D 47.56	C 59.25	X 55.75	
	$\frac{22}{G}$	C 59.31	X 41.25	S 49.50	D 63.00	
	$\frac{23}{G}$	X 42.38	C 42.38	D 55.60	S 56.32	
	$\frac{24}{G}$	D 53.44	S 51.00	X 49.00	C 54.38	
		West.				Terraced plots at different levels. The blocks $\frac{21}{G}$, etc., in different levels.

Block " L "

		East.				S = Sunn-hemp. D = Dhalicha. C = Cowpea. X = Nil.
Same level	L—6	D 30.75	C 26.19	S 24.81	X 16.25	
	L—7	X 17.75	S 30.06	C 20.63	D 35.63	
	L—8	C 27.63	D 30.75	X 24.44	S 31.81	
	L—9	S 24.19	X 19.19	D 22.00	C 24.25	
		West.				Terraced plots at different levels. The blocks L—6, etc., are in different levels.

APPENDIX XII.

RESULTS OF SUGARCANE OF THE SUGARCANE MANURIAL EXPERIMENT PLOT,
DACCA FARM—SEASON 1939-40 PLANT CROP.

Size of plot=0.02 acres.

S = Sucrose.
R. S. = Reducing sugar.
P = Purity.
C. P. = Cane per plot.
G. P. = Gur per plot.

Date of Analysis.

		4th March 1940.	5th March 1940.	6th March 1940.	7th March 1940.	8th March 1940.	9th March 1940.
Pan sample :—							
Sucrose.	.. Per cent.	1	B	A	D	C	E
Reducing sugar	.. "	19.72	19.89	20.14	20.42	20.21	20.58
Purity	.. "	0.70	0.64	0.47	0.48	0.48	0.46
Cane per plot	.. "	91.97	93.04	94.67	93.63	93.75	96.42
Gur per plot	.. "	4 6 4 ch.	5 4 2 ch.	5 4 1 ch.	5 3 8 ch.	5 3 13 ch.	5 3 6 ch.
	.. "	0 16 8 "	0 23 0 "	0 20 0 "	0 23 8 "	0 15 8 "	0 23 0 "
Pan sample :—							
Sucrose	.. Per cent.	2	F	C	E	B	D
Reducing sugar	.. "	19.96	19.62	20.01	20.63	19.88	20.03
Purity	.. "	0.71	0.67	0.62	0.50	0.64	0.54
Cane per plot	.. "	93.11	92.57	94.09	96.20	93.31	93.40
Gur per plot	.. "	6 18 5 ch.	7 4 12 ch.	7 14 1 ch.	5 3 6 ch.	7 3 10 ch.	5 8 12 ch.
	.. "	0 24 0 "	0 35 12 "	0 34 4 "	0 20 12 "	0 30 8 "	0 27 4 "

	3	D	10	B	15	F	22	E	27	A	34	C
Sucrose	..	Per cent.	19.06	19.70	19.64	20.63	20.95	20.36	20.38	19.38	19.38	
Reducing sugar	..	"	0.68	0.65	0.58	0.47	0.38	0.42	0.51	0.51	0.51	
Purity	..	"	92.51	91.87	92.95	96.20	95.17	94.67	92.44	92.44	92.44	
Cane per plot	..	"	8 18 8 ch.	7 25 4 ch.	6 3 1 ch.	5 3 11 ch.	5 9 7 ch.	6 4 3 ch.	6 4 3 ch.	6 4 3 ch.	6 4 3 ch.	
Gur per plot	..	"	0 30 12 "	0 31 0 "	0 22 8 "	0 22 0 "	25 4 0 "	0 28 0 "	0 28 0 "	0 28 0 "	0 28 0 "	
-6												
Sucrose	..	Per cent.	20.25	20.15	20.22	20.29	20.34	20.36	20.36	20.36	20.36	
Reducing sugar	..	"	0.63	0.66	0.81	0.57	0.53	0.42	0.51	0.51	0.51	
Purity	..	"	93.84	93.84	94.56	95.63	95.22	94.67	92.44	92.44	92.44	
Cane per plot	..	"	6 4 2 ch.	6 24 8 ch.	7 14 0 ch.	7 3 15 ch.	7 3 2 ch.	6 32 14 ch.	6 32 14 ch.	6 32 14 ch.	6 32 14 ch.	
Gur per plot	..	"	0 26 4 "	0 29 4 "	0 36 8 "	0 30 0 "	0 33 4 "	0 26 6 "	0 26 6 "	0 26 6 "	0 26 6 "	
5												
Sucrose	..	Per cent.	20.54	20.52	20.38	19.84	19.88	20.28	20.28	20.28	20.28	
Reducing sugar	..	"	0.56	0.63	0.54	0.69	0.54	0.44	0.44	0.44	0.44	
Purity	..	"	95.17	95.70	95.33	93.49	94.60	93.99	93.99	93.99	93.99	
Cane per plot	..	"	7 12 14 ch.	7 3 9 ch.	8 32 13 ch.	8 3 9 ch.	6 33 10 ch.	6 23 7 ch.	6 23 7 ch.	6 23 7 ch.	6 23 7 ch.	
Gur per plot	..	"	0 31 0 "	0 35 4 "	0 37 8 "	0 32 12 "	0 25 8 "	0 27 4 "	0 27 4 "	0 27 4 "	0 27 4 "	
6												
Sucrose	..	Per cent.	19.43	20.07	20.22	19.88	19.96	19.38	19.38	19.38	19.38	
Reducing sugar	..	"	0.72	0.65	0.71	0.67	0.62	0.62	0.62	0.62	0.62	
Purity	..	"	91.88	93.60	94.30	93.52	92.65	92.72	92.72	92.72	92.72	
Cane per plot	..	"	6 31 6 ch.	7 4 7 ch.	8 4 3 ch.	7 4 2 ch.	7 23 4 ch.	7 3 5 ch.	7 3 5 ch.	7 3 5 ch.	7 3 5 ch.	
Gur per plot	..	"	0 22 4 "	0 30 4 "	0 35 4 "	0 35 8 "	0 34 12 "	0 31 12 "	0 31 12 "	0 31 12 "	0 31 12 "	

Doses of manures applied in lbs. per acre.

Serial No.	Manurial Reference.	Treatment.	Cowdung.	Steamed bonemeal.	Castor cake.	Nicifos hot weather.	Nicifos Monsoon.
1	Cowdung	A	150 mds.	..	....	....	....
2	Cowdung+Steamed Bone meal	B	150 "	168 lbs.	....	....	....
3	Cowdung+Castor cake (4in. trench x 4in. 1st earthing).	C	150 "	....	{ 305 lbs. in trench 305 lbs. in 1st earthing.	....	....
4	Cowdung+Castor-cake+Steamed Bonemeal ..	D	150 "	168 lbs.	610 lbs.	....	....
5	Cowdung+Nicifos—hot weather application (1st earth).	E	150 "	....	....	200 lbs.	....
6	Cowdung+Nicifos—half hot weather+ ½ monsoon application (1. e., second earthing).	F	150 "	....	....	100 lbs.	....

Rate of application per acre : + N₁ = 36 lbs. & P₁ O₁ = 32 lbs.

APPENDIX XIII.

MONTHLY PLANTATION EXPERIMENT, DACCA FARM.

Variety Co. 331, 1939-40.

Area of each plot-1½ Katha only.

4 lines of canes—68' long.

Planted on 15th day of each month.

E

				Mds. sr. ch.								Mds. sr. ch.			
N	42	December cane	..	15	19	0		1	November cane	..	16	31	0		
	41	January cane	..	15	30	0		2	May cane	..	5	25	0		
	40	April cane	..	13	23	0		3	March can	..	16	0	0		
	39	November cane	..	17	15	0		4	December cane	..	17	12	0		
	38	May cane	..	6	11	0		5	January cane	..	15	15	0		
	37	March cane	..	17	31	0		6	February cane	..	15	20	0		
	36	February cane	..	15	14	0		7	April cane	..	15	20	0	S	
<hr/>															
	35	November cane	..	19	27	0		8	February cane	..	17	0	0		
	34	May cane	..	6	1	0		9	March cane	..	14	10	0		
	33	February cane	..	17	11	0		10	April cane	..	15	24	0		
	32	April cane	..	13	32	0		11	November cane	..	19	18	0		
	31	December cane		16	39	0		12	January cane	..	18	1	0		
	30	January cane	..	17	22	0		13	December cane	..	18	3	0		
	29	March cane	..	16	10	0		14	May cane	..	6	38	0		
<hr/>															
	28	January cane	..	17	2	0		15	December cane	..	19	33	0		
	27	April cane	..	12	38	0		16	January cane	..	17	4	0		
	26	May cane	..	6	29	0		17	November cane	..	5	15	0		
	25	February cane	..	13	32	0		18	March cane	..	19	5	0		
	24	March cane	..	15	32	0		19	April cane	..	14	28	0		
	23	November cane	..	14	29	0		20	February cane	..	17	32	0		
	22	December cane	..	13	13	0		21	May cane	..	6	7	0		

W

APPENDIX XIV.

SPACING EXPERIMENT ON SUGARCANE VARIETY Co. 381 AN EARLY VARIETY
CANE—SEASON 1939-40, WEST SUTI, DACCA FARM.

4 feet and 3 feet harvested on 6th and 7th January 1940.

E

13 ft. only.

				Mds. srs.	Feet.	
	1	{ 3 lines	.. ..	1 17	4	
		{ 3 lines	.. ..	2 0		
	2	{ 4 lines	.. ..	2 24	3	
		{ 4 lines	.. ..	3 5		
	3	{ 3 lines	.. ..	2 14	4	
		{ 3 lines	.. ..	2 21		
	4	{ 4 lines	.. ..	2 35	3	
		{ 4 lines	.. ..	3 18		
	5	{ 3 lines	.. ..	1 34	4	
		{ 3 lines	.. ..	2 8		
N	6	{ 4 lines	.. ..	3 38	3	S
		{ 4 lines	.. ..	3 5		
	7	{ 3 lines	.. ..	2 9	4	
		{ 3 lines	.. ..	2 29		
	8	{ 4 lines	.. ..	3 10	3	
		{ 4 lines	.. ..	3 11		
	9	{ 3 lines	.. ..	2 31	4	
		{ 3 lines	.. ..	3 3		
	10	{ 4 lines	.. ..	3 14	3	
		{ 4 lines	.. ..	3 25		
	11	{ 3 lines	.. ..	3 10	4	
		{ 3 lines	.. ..	2 23		
	12	{ 4 lines	.. ..	3 8	3	
		{ 4 lines	.. ..	3 1		

W

APPENDIX XV.

SPACING EXPERIMENT OF Co. 421 (LATE VARIETY), WEST SUTI, DAOCA FARM,
1939-40.

4 feet and $3\frac{1}{2}$ feet.

W

68' long				Mds. srs.		
7 lines of canes	..	..	..	35	5	} 4'
7 lines of canes	..	..	..	35	9	
8 lines of canes	..	..	..	39	22	} $3\frac{1}{2}'$
8 lines of canes	..	..	..	39	21	
7 lines of canes	..	..	..	32	1	} 4'
7 lines of canes	..	..	..	37	2	
8 lines of canes	..	..	..	38	21	} $3\frac{1}{2}'$
8 lines of canes	..	..	..	36	24	
7 lines of canes	..	..	..	32	28	} 4'
7 lines of canes	..	..	..	34	9	
8 lines of canes	..	..	..	39	20	} $3\frac{1}{2}'$
8 lines of canes	..	..	..	37	18	
7 lines of canes	..	..	..	36	11	} 4''
7 lines of canes	..	..	..	39	15	
8	....	..	..	16ft. only 4 lines		Odd area $3\frac{1}{2}'$

E

3	Co. 511	..	3-11-1939 20-12-1939 4-1-1940 16-1-1940 31-1-1940	13-61 18-12 18-79 19-19 20-24	1-79 0-89 0-82 0-86 0-98	83-43 93-77 94-72 94-79 93-08	16-09	11-64	715-9	87-5	8-1:1	
4	Co. 532	..	3-11-1939 20-12-1939 4-1-1940 16-1-1940 1-2-1940	11-78 16-45 18-26 18-65 20-12	1-67 0-65 0-50 0-57 0-33	76-92 92-26 94-40 94-31 97-07	15-34	16-26	790-6	86-3	9-1:1	
5	Co. 453	..	4-11-1939 8-12-1939 21-12-1939 4-1-1940 16-1-1940	11-76 14-27 17-92 14-87 18-78	2-47 3-06 2-00 4-00 2-00	74-41 76-46 85-92 77-73 88-32	..	..	603-1	..	..	Used up for pro- pagation.
6	Co. 544	..	4-11-1939 21-12-1939 4-1-1940 10-2-1940 12-3-1940	11-80 16-36 16-90 15-91 19-38	3-25 1-92 2-73 3-71 0-86	73-50 85-79 85-13 77-49 94-78	14-96	16-55	820-3	85-0	9-6:1	

APPENDIX XVI—*contd.*

Serial No.	Name of variety.	Date of analysis.	Sucrose.	Re- ducing sugar.	Purity.	Total sucrose in cane.	Fibre.	Yield per acre in maunds.		Ratio cane to Gur.	Remarks.
								Cane.	Gur.		
7	Co. 445		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.				
		4-11-1939	8.82	3.25	66.24	15.64					
		21-12-1939	17.64	1.73	88.91						
		4-1-1940	19.04	1.40	92.38		14.32	651.3	80.0	8.1:1	
		9-2-1940	17.80	1.26	90.12						
		11-3-1940	19.79	0.47	94.63						
8	Co. 529										
		4-11-1939	13.81	1.92	82.15	15.44					
		21-12-1939	17.16	0.98	89.96						
		4-1-1940	17.63	1.10	90.96		14.82	667.6	64.5	10.3:1	
		16-1-1940	19.75	1.26	92.73						
		2-2-1940	19.90	1.00	92.44						

Remarks.—Varieties selected for final test—Co. 326, 511 and 529.
 Varieties retained for further observation—Co. 453, 544 and Co. 213 (Standard).
 Varieties rejected—Co. 532 and 445.

**Annual Report of the Deputy Director of Agriculture, Eastern Circle,
for the year 1939-40.**

Circle.—The Circle consists of Dacca and Chittagong Divisions. Total population is roughly 20 millions.

Charge.—Mr. W. M. Clark, M.B.E., B.Sc., I.A.S., held charge throughout the year. The sanctioned appointment of Superintendent of Agriculture had not been filled when the year ended.

(a) **Staff.**—*Dacca Farm.*—Babu S. P. Sen Gupta, B.Ag. (Bomb.), held charge as Chief Superintendent, being assisted till the 12th October 1939 by Maulvi Hossain Ali as Farm Superintendent and afterwards by Maulvi Anwaruddin Ahmed, a new recruit to the Subordinate Agricultural Service grade. They were assisted by 4 Overseers and 2 Agricultural Demonstrators. On one occasion the most senior and competent Overseer had to be set free to take charge of the Dacca District and towards the end of the year the same man left to take charge of the Noakhali district. The Chief Superintendent in consequence of these changes had much extra work thrust on his shoulders and deserves credit for carrying on as he did.

District Staff.—There were 7 District Agricultural Officers in the districts of Dacca, Faridpur, Bakarganj, Mymensingh, Tippera, Noakhali and Chittagong, while a senior officer in Class II of the Subordinate Agricultural Service was placed in charge of the Jamalpur and Tangail subdivisions of the exceedingly large district of Mymensingh. These 8 officers were assisted by 54 Agricultural Demonstrators of whom 10 were temporary.

In addition to the above staff 8 Overseers and 33 Agricultural Demonstrators were appointed and paid from the grant of the Indian Central Jute Committee.

All of these were controlled by the Deputy Director of Agriculture, Eastern Circle. The men paid by the Jute Committee were engaged to investigate the marketing of jute in the different jute growing centres of this Circle. They were also engaged for some time in Jute Census trials under the direct charge of a Special Officer of the Jute Committee.

Temporary demonstration staff is also employed by Local Bodies such as District Boards, Courts of Ward, Khas Mahal and Private Zamindari Estates for the improvement of agriculture in their respective jurisdictions. The schemes on which they are employed are drawn up by the District Agricultural Officers and in most cases supervised by them also.

A statement showing the strength in various districts is given below:—

Dacca.

Under the Joydebpur Court of Wards	...	...	2
	Total	...	2

Bakarganj.

Under the Khas Mahal	...	...	2
Under the District Board	...	...	6
	Total	...	8

Tippera.

Under the Wards Estates (including one Overseer)	...	...	7
Under the Khas Mahal	...	...	2
Under the Rural Reconstruction Society	...	...	1
	Total	...	10

Noakhali.

Under the District Agricultural Scheme inaugurated by the Collector	...	...	...	6
	Total	...	...	6

Chittagong.

Under the Khas Mahal	...	...	...	4
	Total	...	...	4

Mymensingh.

Under the Court of Wards	...	...	...	1
Under the Zaminder of Six-Annas Estate, Santosh (Tangail subdivision)	...	...	...	1
	Total	...	...	2
	Grand total	...	...	32

A statement showing the Agricultural Staff in this Circle is given in Appendix I. Further additional staff is indispensable to form a network of agricultural propaganda throughout the Circle as more than 90 per cent. of the population depend upon agriculture.

Tours.—I was out on tour for 139 days. The Farm Superintendent was out on tour for 7 days and District Agricultural Officers were out on tour as noted below:—

	Number of days on tour.
District Agricultural Officer, Dacca ...	100
District Agricultural Officer, Faridpur ...	120
District Agricultural Officer, Bakarganj ...	102
District Agricultural Officer, Mymensingh ...	163
District Agricultural Officer, Tippera ...	156
District Agricultural Officer, Noakhali ...	145
District Agricultural Officer, Chittagong ...	149
Agricultural Officer, Jamalpur (Mymensingh) ...	153

Season.—Against a normal of 70 inches Dacca Farm recorded 95·14 inches with periods of great intensity in July-August and in October which seriously affected the outturns of aus and aman paddy especially. On the whole the year was a good one.

Following good rains in February 1939 land was got ready and sowings made under good conditions in the low-lying areas. Subsequent prolonged drought, however, made growing conditions difficult and in many areas impossible. The same kind of trouble was experienced on higher lands, but the good rains in May changed the situation entirely. The rains were then normal until July-August when as much as 29 inches was recorded in 7 days at Dacca Farm. The later heavy rains in October came at an awkward time for aman paddy in that the plants were flowering and, the pollen being washed away, many flowers were not fertilized. The grain yield was much below normal at many places and very much less than the appearance given by the standing crop. Bumper yields were common and would have been general but for that rain. The same rain and rather unusually heavy showers in November delayed cultivation of the heavier soils for rubi crops and damaged seedlings. Later, as is so often the case, the late sown and still tender plants suffered badly from insects, e.g., mustard which in many areas was wiped out by aphids. It was also a year in which wilt was very common and severe among Tomatoes.

(b) Names of Government Farms including a Brief Review of the Work done by each.—

N.B.—Yields of the previous year, when given, are shown in brackets.

There are 10 such farms on 5 of which the work is all done by tenants or bargadars on a share tenancy basis. Separate reports are published and may be consulted for details. A new district farm is in

process of being built in Chittagong district and proposals for two others in Mymensingh and Noakhali districts have been submitted.

Name of farm.				Area in acres.	Remarks.
1.	Dacca	..	..	353.70	
2.	Mymensingh	..	..	20.00	
3.	Comilla	..	..	20.00	
4.	Barisal	..	..	20.00	
5.	Faridpur	..	..	20.48	
6.	Kishoreganj	..	..	61.90	Barga.
7.	Jamalpur	..	..	33.50	Do.
8.	Dhanbari	..	..	6.16	Do.
9.	Charbadna	..	..	60.83	Do.
10.	Rajbari	..	..	10.00	Do.

Dacca Farm.—In accordance with procedure of many years' standing the Farm Staff did no experimental work of their own and merely provided facilities for work done by the Chemist, the two Botanists, etc. The position with respect to experimental work is unusual and not in the best interests of the farm or of the Expert Staff. It can only be justified by reason of lack of sufficient Field Staff to undertake the detailed supervision of field work now done by the various Laboratory Research Workers.

Separate reports for the farm and for the work done by the experts are published. All that requires to be noted here is the effect of the unusual season as reported in a previous paragraph on yields.

Paddy.				Acres.	Lbs. per acre.
Average yield of aus	..	..	..	24.55	744 (1,197)
Average yield of aman	..	..	..	52.65	1,444 (1,690)

Aman yielded better than in 1937-38 when the average was only 1,230 lbs. but aus paddy in that year yielded 1,193 lbs. per acre.

What is called the Economic Area of 14.49 acres was planted with aman. The various charges shown against the crop can be seen at Appendix V of the Farm Report and do not err on the low side. A profit of Rs. 15-9-3 per acre was made.

Sugarcane.—Outturn of gur was 42,078 (43,560) lbs. which was sold at Rs. 6-3 (Rs. 5-1) per maund of 82 lbs. A further 1,35,150 cuttings were despatched.

Paddy grown and stored for seed purposes.—

				Lbs.
Aus	..	..	..	18,238 (49,023)
Aman	..	..	..	76,016 (95,974)

Napier Grass.—Being planted on high and well drained land the heavy rains helped to give a high yield and the various plots, consisting of 10.1 acres of newly planted grass and others ranging up to 6 years old and amounting to 42.59 acres in all, gave an average green weight yield of 38,025 lbs. per acre.

Artificial Farm Yard Manure.—A total of 285 tons/688,400 lbs. was produced from plant refuse.

Mymensingh Farm.—*Economic area.*—Dhaincha was grown and ploughed in as a green manure on 1.25 acres and aman planted which yielded at the rate of 2,189 lbs. per acre.

A loss of Rs. 46.5 was shown as against a loss of Rs. 60 per acre in the previous year for which heavy overhead charges were responsible.

Paddy grown and stored for seed purposes.—

					Lbs.
Aus	..	..	..	..	5,166 (7,570)
Aman	..	..	..	..	11,736 (9,352)

Manure made from plant refuse 16,400 (24,600) lbs.

Comilla Farm.—Aus followed by aman paddy on a total of 8.34 acres gave an average combined yield of 3,271 (3,794) lbs. per acre.

The Economic Area of 1.30 acres put under these crops gave:—

					Lbs.
Yield of aus	..	..	..	..	2,230
Yield of aman	..	..	..	..	2,520
Total	..	..	..	..	4,750 = 3,950 lbs. per acre

Supervision charges are very high and profit was Rs. 2.7 only.

Seed grown and stored for seed purposes.—

					Lbs.
Aus	..	..	..	..	13,279 (16,785)
Aman	..	..	..	..	17,751 (15,230)

Manure made from plant refuse—196,000 (1,26,000) lbs. including an estimated 26,000 lbs. from water hyacinth.

Barisal Farm.—The Economic Area of 3 acres grew aman paddy only since the district is mainly a one crop one and yielded a total of 6,605 (5,964) lbs. or 2,200 lbs. per acre.

Seed grown and stored for seed purposes.—

					Lbs.
Aus	..	..	..	..	1,960 (2,560)
Aman	..	..	..	..	24,952 (19,520)

Manure made from plant refuse 67,240 (69,000) lbs.

Faridpur Farm.—Accounts to show profit or loss were kept for an area of 2·81 acres from which the yield of Dharial aus in the Kharif season was 3,864 lbs. Of the above area 1·96 acres subsequently grew tobacco, lentils and linseed from which the yields were as under:—

			Lbs.
Tobacco	..	..	132
Lentils ..	..	..	500
Linseed	..	..	120

The accounts showed a loss of Rs. 127-12.

The yields were low due to the bad weather reported elsewhere.

Seed grown and stored for seed purposes.—

				Lbs.
Aus ..	..	..	..	6,066 (3,790)
Aman ..	..	..	..	8,546 (3,697)

Manure made from plant rubbish = 24,240 (45,600) lbs.

(c) **Barga Farms.**—These farms are on Government land and are worked by tenants on a crop-sharing basis. Government's share of the produce of the main crops grown is usually one half.

Name of farm.	Area.	Crop.	Yield of paddy in lbs.	Yield per acre in lbs.
Kishoreganj	32·94	Aus ..	31,860	977 (1,930)
	20·88	Aman ..	23,184	1,115 (1,088)
Jamalpur	20·64	Aus ..	14,300	692 (1,052)
	11·84	Aman ..	16,709	1,411 (1,680)
Dhanbari	3·59	Aus ..	4,100	1,300 (866)
	1·34	Aman ..	2,160	1,612 (1,680)
Charbadna .. ..	..	Aus ..	..	....
	55·03	Aman ..	91,370	1,660 (1,516)
Rajbari	2·76	Aus ..	1,760	638 (17)
	..	Aman ..	..	....

(d) **Union Board Farms and Demonstration Centres.**—The 35 Union Board Farms and 100 Demonstration Centres mentioned as having been opened in last year's report were continued and 6 new Union Board Farms and 32 Demonstration Centres started. A district improvement scheme in the Noakhali district brought the number of Demonstration Centres up to 163 in the rabi season. A total of Rs. 11,425-7-3 was spent by the Department on seeds, manures, implements and subsidies for erection of seed stores and manure sheds. Details are given in Appendix II, and it is merely necessary to add, for the information of those not acquainted with the programme of demonstration on cultivators' holdings, that each Demonstrator has charge of one Union Board Farm and 3 Demonstration Centres all being within a Circle of 5 miles radius from his headquarters. The Demonstrator stays at the same headquarters for 3 years working at the same Union Board Farm all of that time. Demonstration Centres are changed each year unless flood or drought make it necessary to repeat the work at any one place. These men are due to change their headquarters in April 1941 and they will then work in their present areas only at the Union Board Farm.

Tentative conclusions were all that could be drawn last year in view of the widespread flood damage in the Kharif season and the extreme drought of the rabi one. The year 1939-40 was much more kind and it is now possible to form definite opinions on the scheme as a whole and on the suitability of the sites and men originally chosen by the District Agricultural Officers.

On these last two points, last year's Report stated that 5 out of the 35 Union Board Farms would have to be changed and of these one each in Bakarganj, Tippera and Dacca districts actually were changed, it proving difficult to get good alternatives at the other two places one in Bakarganj and one in Faridpur district. Alternatives had been found near the close of the year it was believed, and in addition the District Agricultural Officers were seeking for new sites in three other cases, i.e., 8 in all out of the original 35 have proved to be failures while all of the balance, it must be admitted, are not working entirely as intended. Absolute confidence can be felt about 18 only.

Such wastage is inevitable, and there must always be some because of deaths, and the matter is worrying chiefly because it is impossible to get back in all cases the subsidies paid out for erection of seed stores—Rs. 50 per Union Board Farm. New money cannot be allotted for that purpose in the same area and good new Union Boards farmers naturally get disgruntled. It has been suggested that we should cut out these subsidies entirely.

The more important results and features of a scheme which we now know to be basically sound and to require alteration in details only are given in the following paras.

Paddy.—A total of 115.40 acres under aus and 69.02 under aman at Union Board Farms yielded 1,830 maunds (146,400 lbs.) of aus and 1,669 maunds (133,520 lbs.) of aman. Of these quantities 711 maunds (56,880 lbs.) of aus and 802 maunds (64,160 lbs.) had been sold, exchanged or stored for seed purposes by the 31st March 1940 and

percentages set aside for seed purposes were, therefore, 39 and 48 respectively.

At Demonstration Centres a total production of 9,655 maunds (772,400 lbs.) of aus and 7,699 maunds (615,920 lbs.) of aman were reported with 2,691 maunds (215,280 lbs.) of aus and 2,937 maunds (234,960 lbs.) of aman exchanged, sold and stored. The percentages set aside for seed purposes were, therefore, 28 and 38 respectively. Figures for each district charge may be seen at Appendices III and IV.

Paddy is naturally the crop first in importance with cultivators but the Appendix shows total production at Union Board Farms under other heads as under:—

Jute—210 maunds.

Artificial Farm Yard Manure—13,131 maunds.

Silage—920 maunds.

The amount of manure made from water hyacinth and from field weeds and other plant rubbish is gratifying, but requires even greater emphasis than it has had and it has now been laid down that the demonstrators must make one heap with their own hands at each centre. In a country of poor cultivators such as Bengal the fact that the manure supply can be doubled at the cost of labour only must be stressed at all times. Side by side comparison of manured and unmanured crops must also be part of each Demonstrator's routine.

Another successful feature has been the growing of English Vegetables such as Cabbage, Cauliflower, Tomatoes and Knolkhol. Many of our Union Board Farmers reported cash returns of Rs. 15 and more. Success or failure with these crops depends mostly on the care given in seed-beds and especially the control of water-supply. A good roof to guard against the effects of heavy rain is particularly important.

Potatoes from seed which we bought in Darjeeling were only good when compared to the same crop produced from local seed. Germination took place over a very long period of time proving that the dealers had supplied a very high proportion of immature seed. As we have no control over supplies and as the crop is now well-known it has been decided to discontinue work with it.

Groundnuts have done well on suitable soils, but it is difficult to secure for Eastern Bengal seed of good germinating capacity for planting in the rabi season. The matter has been brought to the attention of the Second Economic Botanist as there appears to be hopes of a wide extension of a short-lived, erect type of the crop on, up to 50 per cent. of the silt and sandy silt soils on the banks of rivers on which jute is always sown. Such soils grow, at present, nothing but jute and it is believed that the latest sown areas might well produce a previous crop of groundnut.

The value of any scheme of demonstration can be judged only by the number of people who willingly acknowledge benefit from it and in proof of our efforts several factual accounts of benefit, given in writing by various Union Board Farmers, have been published in the

Propaganda publication in Bengali the "Krishi Katha." Meetings to bring out the facts under the criticism of their neighbours were held at all Union Board Farms at or near the Kharif and Rabi harvest seasons and never less than twice at each holding.

Demonstration of Implements.—There is again little to report. Sales of the former standard of Bengal and Subkam ploughs have been few and even the wheel intercultivators which we had much hope of selling as the types are light and handy, having risen in price from Rs. 9-10 to Rs. 15 have become practically unsaleable. We sold 2 ploughs and 5 intercultivators before the outbreak of war, while 15 ploughs and 26 intercultivators were given away as prizes at exhibitions.

Trials with a new Plough.—A designer of ploughs for Eastern Bengal has to face up to the following difficulties:—

1. Transport is by water and the village tracks along which men and bullocks have to go to the fields can be taken in single file only. Instead of slinging his plough over the yoke pole of his bullocks and driving them as a pair to his fields the cultivators has to drive his bullocks in front of him and carry the yoke pole and the plough on his own shoulder. The plough must, therefore, be very light.

2. Eastern Bengal is not a natural cattle-breeding area and many of the bullocks have been imported and are weak. Practically all have had no training and the traditional way of guiding them is to be so close to their rumps that they can be pushed or poked into going in the right direction. Any plough must be designed to work right at the animals' heels.

3. It is further desirable that village blacksmiths and carpenters should be able to build up and repair any plough in common use and that is not the case with our Bengal and Subkam ploughs, excellent though they are. They are made of heavy castings with only the share tips replaceable.

4. It is needless to add that as the dearest cultivator's plough never costs more than Rs. 2 the price of any improved plough must be as near that figure as possible. Efficiency at that price has not, so far, proved possible but the Agricultural Engineer, towards the end of the year, produced a plough of which the sole beam, stock and draught pole are of wood and could be put together by an intelligent cultivator or village carpenter, while a cast iron share could be bought for twelve annas and the various other iron parts such as the mild steel mould-board for something approaching the Rs. 2 figure taken as desirable.

A sample of this plough has been ordered for each Demonstrator as, from the trials made (and provided sound seasoned wood be used), there seems to be no doubt that it will prove popular and be more suited to Bengal than the Arakan type imported by this Circle to prove that lightness, simplicity and a fair degree of efficiency could be got. The complete plough, at war prices, costs Rs. 5-8 and weighs not more than 12 seers (say 25 lbs.).

Trials with Wooden Toothed Harrow.—This implement, which is in common use from Bombay to Burma, has never come into use in Bengal. The reasons for not using it are not known and as it is an excellent implement for puddling especially, trials will be made on Government farms in the year 1940-41.

(e) **Seed Farms other than Union Board ones, their addresses and the work done by each.**—The following seed farms were in existence during the year under report and the owners are taking a keen interest in growing the Departmental recommended crops.

Name of district.	Centre.	Name of owner.	Area in acre.	Variety of crops grown.
Dacca ..	Rautkana ..	Md. Chamuri Pradhania.	33·00	Departmental aus, aman, Co. 213 Sugarcane, Jute and rabi crops.
	Silmandi ..	Md. Khayeruddin	25·00	Departmental aus and aman. 200 mds. were stored.
	Palasona (Kasimpur).	Late Sambhu Ch. Bhattacharjee.	66·00	Departmental aus and aman. 150 mds. were stored.
	Ulail (Manick-ganj).	Parbati Ch. Chakravarty.	30·00	Departmental aus and aman. 50 mds. were stored.
Mymensingh ..	Satkura (Jamalpur).	Md. Lal Mohon Taluqdar.	10·00	Departmental aus and aman.
	Nandina (Jamalpur).	Susil Ch. Bose ..	12·00	Ditto.
	Sharifpur .. (Jamalpur).	Hyder Maulik ..	8·00	Departmental aman.
	Durmut (Jamalpur).	Syed Rashiduzzuman.	8·00	Ditto.
	Islampur (Jamalpur).	Mosharaff Hossain	8·00	Ditto.
	Nandina (Jamalpur).	Taraffuddin ..	10·00	Departmental aus.
Tippera ..	Dhampti ..	Pabitra Mohan Pal	5·00	Departmental aus. 110 mds. stored.
	Banasua ..	Basanta Kumar Ray.	10·00	Departmental aus. 45 mds.
	Faridganj ..	Karim Baksh ('houthury.	5·00	Departmental aus. 32 mds.
	Srimantapur	Amjadali ..	8·00	Departmental aman. 40 mds.
	Harong ..	Abdul Hamid ..	3·00	Departmental aus and aman. 47 mds.
	Jaffabad ..	Devendra Nath Chakravarty.	10·00	Departmental aman. 95 mds.
	Khatasar ..	Gani Bhuia ..	35·00	Departmental aman. 600 mds.
	Rangpur	Nagon Ali ..	30·00	Departmental aman. 450 mds.
	Khetasar ..	Ansar Ali Hazi ..	12·00	Aus and aman. 35 mds.
	Durgapur ..	Brahmananda Roy	9·00	80 mds.
	Champaknagar	Aradhar Sardar	8·00	Aus. 30 mds.

(f) **Brief Note on Private Farms in the Circle.**—A statement showing the private farms managed by the different agencies are given below :—

I. Under Khas Mahal:—

Farm at Char-Nilkamal (Tippera district).

II. Under Court of Wards:—

- (1) Joydebpur Farm of the Bhowal Court of Wards Estate in the district of Dacca.
- (2) Gayhatta Farm in the district of Mymensingh.
- (3) Paschingaon and Nangalkot Farm of the Badaranessa Estate, Barkanta and Nangalkot Farms of the B. K. Raj Estate, Debiduar Farm of the Kazi Estate and Matipur Farm of the Mirjilpur Estate. These are in the district of Tippera.

III. Private Farms:—

(1) *Mymensingh District:—*

- (a) Shasa Farm 100·00 acres of the Maharaja Bahadur of Mymensingh.
- (b) Begunbari Farm 8·00 acres of the Maharaja Bahadur of Mymensingh.
- (c) Gouripur Farm 20·00 acres of the Raja of Gouripur.
- (d) Baratya Farm of the Six Annas Estate of Santosh 8·00 acres.
- (e) Gilabari Farm of Maulvi Abdul Jabbar Palooan, M.L.A., 300·00 acres.

Tippera district:—

The Brahmanbaria Farm of Raja Kamala Ranjan Roy
of Kashimbazar ... 5·00

Chittagong:—

- (a) The Dineshpur Farm of Rai Bahadur Khired Chandra Roy ... 26·00
- (b) Shelkot Farm of Sheik Maulvi Wajed Ali Choudhury ... 500·00
- (c) Churamani Farm of Babu Chandra Das ... 30·00
- (d) Sanua Farm of Sanua Samahaya and Palli Sanskar Samity ... 10·00
- (e) Santi Niketan Farm of Pandit Subal Chandra De ... 20·00
- (f) Bhatary Farm of Sati Mohan Sen ... 50·00
- (g) Nanpur Farm and Fishery, Limited ... 72·00

Brahmanbaria Farm.—The total area of the Farm is 5·00 acres of which 3·5 acres were under cultivation. The rest are occupied by buildings, roads and tanks.

The soil is very fertile and mostly double cropped.

The average outturn of aman and aus paddies in the double cropped area amounted to 52 maunds 30 seers (4,220 lbs.) per acre.

(g) (i) **Seed Stores including Financial Statements of their receipts and expenditure.**—There are seven seed-stores attached to each of the Government Farms at Dacca, Mymensingh, Comilla, Barisal, Faridpur, Kishoreganj and Jamalpur.

The financial statements of the seed stores are given in Appendix V.

(ii) Seed stores under private management with their names:—

The following five seed stores were maintained by the Courts of Wards Estates in the district of Tippera during the year under report. These served as temporary godowns for storage of improved seeds for free distribution among the tenants of the estates:—

- (1) Paschimgaon Seed Stores.
- (2) Nangalkot Seed Stores.
- (3) Barkanta Seed Stores.
- (4) Deviduar Seed Stores.
- (5) Majidpur Seed Stores.

There is another Nursery in the district of Chittagong named Diamond Nursery at Bakishat. This Nursery supplied Vegetable seeds and seedlings and flower seeds in the locality.

(h) **Other Demonstration Work conducted, e.g., the number of Lantern and other lectures delivered in each district with the number of cultivators attending each. Improved Implements and any other activity not mentioned under Union Board Farms.**—Seeds are dealt with in paragraph J. Here we merely state the fact that the District Staff delivered a total of 144 lectures of which 45 were illustrated by magic lantern slides. A statement showing the number of lectures and the number of cultivators attending them is given in Appendix VI. Lectures were delivered by means of gramophone talks also.

(i) **Number of Exhibitions and Shows in which the Department participated with details of Propaganda work done.**—Exhibitions were conducted in all except Noakhali district, two in each district except in Faridpur where five were contemplated and four actually dealt with. There were 12 exhibitions in all and for each district we bought prizes such as improved ploughs, intercultivators, axe heads, kodalies, rakes, watering cans and other articles useful to cultivators and gardeners. The prizes and the attractive certificates signed by the Hon'ble Minister and the Director of Agriculture, Bengal, granted in addition to each first winner were much appreciated and should help to raise up a spirit of competition in the production of crops of outstanding merit which Exhibitions are meant to encourage. Strenuous efforts had to be made, and will yet have to be made, to educate Exhibition Committees on the aims and objects of their work. Few Committees, for example, appreciated the following:—

1. That there is a definite best date, the one on which most cultivators will be able to bring forward their own produce for award of a prize. If held too early the best cabbage for example will probably be found to have come from Darjeeling.

2. That exhibitions should be held at the same place every year on the same date.

3. That posters advertising them and the classes for which awards will be given should be printed and distributed in August. Cultivators must know what to prepare for.

The above points and others were brought to the notice of the various Committees and mention is made again here, not to depreciate in any way the very hard work put into these functions, but to make their efforts even more productive of good to cultivators than they have been.

For lack of staff it was rarely possible for the District Agricultural Officers to do more than arrange for practical demonstrations of implements, making of silage, increase in bulk of manure and the manufacture of gur in an improved furnace.

The interest taken by cultivators in these efforts to help them was very gratifying and the Department owes thanks to the large number of officials and non-officials who so generously gave of their time to make the exhibitions a success.

The district and names of exhibitions are given in Appendix VII.

(j) **Supply of various kinds of improved and recommended seeds and cuttings showing quantity of each distributed with comment regarding suitability, demand, needs as yet unsatisfied by the Department, etc.**—A statement showing the various kinds of Departmental improved seeds distribution in the Eastern Circle is given in Appendix VIII.

(k) **Free distribution of seeds other than those supplied to the Union Board and Demonstration Centres for demonstration purpose showing the quantity of each distributed with comment.**—The following seeds and grass cuttings were distributed free:—

In the district of Mymensingh.

Napier cuttings	...	1,79,600
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In the district of Bakarganj.

Patnai paddy	...	49 mds. 8 srs. (3,936 lbs.)
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In the district of Noakhali.

Patnai paddy	...	6 mds. (480 lbs.)
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It is expected there will be great demand for Patnai paddy seeds in the Saline tracts. Madagascar bean which was distributed in small quantities in all districts failed in most of them due to some defect in the seed.

(l) **Particulars of Agricultural Schemes worked out and financed by the (i) Khas Mahal, (ii) Courts of Wards, (iii) District Boards showing the amount spent by each or any other help in kind rendered by them and (iv) the work of the Agricultural Associations in the district.**—Khas Mahal, Courts of Wards, or District Board schemes of Agricultural Demonstration are run either separately or conjointly, in the districts of

Dacca, Mymensingh, Tippera, Faridpur, Noakhali, Chittagong and Bakarganj the sums spent on staff and seeds in each case, being shown below:—

			Rs.
Tippera	...	...	12,520
Noakhali	...	...	3,580
Chittagong	...	...	2,056
Bakarganj	...	...	5,143
Dacca	...	...	2,500
Faridpur	...	...	400
Mymensingh	...	...	811

The Courts of Ward and Khas Mahal schemes in Tippera and Chittagong districts followed the lines of previous years, but changes were made and proposed in those of Noakhali and Bakarganj districts.

Noakhali. The District Board scheme here has always been a six months' one from September to March. The changes proposed and made involved dropping the demand formerly made for a uniform contribution of Rs. 20 from Union Boards, in return for which all expected to have a demonstration plot located within their boundaries, and using the balance, consisting of contributions from the District Board Rs. 2,400, the Khas Mahal Department Rs. 100, Noakhali Central Co-operative Bank Rs. 150, Zamindars Rs. 50 together with savings of the previous year Rs. 130 and outstandings amounting to Rs. 600 due by Union Boards, to run a smaller number of more efficiently supervised plots.

Bakarganj.—The scheme which has been run since 1936 in this area is a combined District Board and Khas Mahal Department one. The view has been taken that some of the earlier demonstration plots have outrun their usefulness, that they were too scattered in any case, and that increased value could be got cutting down the sums spent on mere travelling and spending it on more plots at much closer distances.

All such schemes have been a credit to their authors, but admittedly they are stop-gap arrangements brought into being in default of direct effort by the field staff of the Agricultural Department. Supervision depends on such time as the District Agricultural Officer can spare from his own Departmental work and they all have the fundamental weakness of being temporary. The good men among the demonstrators are always on the look out for a permanent post elsewhere.

A statement showing the activities is given in Appendix IX.

(m) **Note on the Growing of Napier Grass and Manufacture of Artificial Farm Yard Manure and Silage in each farm giving the quantity in Pounds and Standard Maunds and the quantity of Napier cuttings distributed.**—As shown in Appendix X total of 298 maunds (23,164 lbs.) of Napier cuttings were distributed by the staff of the Eastern Circle alone. These were distributed largely from the District Farms at Dacca, Mymensingh, Comilla and Faridpur and from the two bargadar farms in Mymensingh district at Jamalpur and Kishoreganj.

In addition these farms produced the amounts of green fodder shown against their respective acreages below:—

Farm.	Area in acro.	Green fodder.	
		Mds. srs.	Lbs.
Dacca	10.01	682 35	54,630
Mymensingh	0.51	285 30	22,860
Comilla	0.29	49 20	3,960
Barisal	0.54	387 20	31,000
Faridpur	1.00	203 33	16,306
Jamalpur	0.30	12 30	1,020
Kishoreganj	0.97	..	..

Silage was made at the Dacca Farm only from Napier, from Maize and Cowpea sown together and from Juar specially sown for the purpose. A total of 11,93,920 lbs. was made (Appendix XI).

Mention has been made already in the note on Union Board Farms or Demonstration Centres of the 920 maunds (73,600 lbs.) of Silage made in the 4 district charges at Dacca (38,400 lbs.), Jamalpur (6,000), Tippera (16,000) and Chittagong (13,200).

Eastern Bengal, as is well known, desperately needs more fodder and finds it difficult to spare enough upland on which to grow it. The problem, however, is not everywhere insoluble. There is much land round-about house sites which could grow Napier quite well even in areas where no other high land is available and, from the other end of the problem, which is the special province of the Live Stock Section, there are far too many useless animals being kept. Further, there are grasses grown in the Province which will grow in water. Work can be done along all of these lines and District Officers must just keep working on encouraging effort suited to the various places they visit.

Artificial Farm Yard Manure is only artificial in that plants are broken down into plant food outside and not, at least partly, inside an animal's stomach. The bacteria voided in the fresh manure is the chief agent in the breaking down of the material.

Such manure, made from field weeds and other rubbish, was produced at our various farms as under:—

				Amount produced in 1939-40.	
				Mds.	Lbs.
Dacca .. .. .	..	..	..	7,980	6,38,400
Mymensingh .. .. .	..	..	..	200	16,000
Comilla .. .. .	..	..	..	1,100	88,000
Barisal .. .. .	..	..	..	841	67,240
Faridpur .. .. .	..	..	..	303	24,240
Kishoreganj .. .. .	..	..	..	32	2,460
Jamalpur .. .. .	..	..	..	120	9,600
Dhanbari .. .. .	..	..	..	120	9,600
Charbadna .. .. .	..	..	..	113	9,040
Rajbari .. .. .	..	..	..	60	4,800

The amount made at the Union Board Farms and Demonstration Centres amounted to 13,131 maunds (10,50,480 lbs.).

(n) **Progress with regard to the organisation of Co-operative Agricultural and Irrigation Societies.**—There is nothing to report under these heads and although little can probably be done with them in the next 4 years since the district staff is more likely to lessen than increase until the new Agricultural Institute begins to turn out men, it is important that such voluntary efforts should not be allowed to die for lack of use.

With this end in view it has been suggested that these bodies and even Union and District Boards might use part of their funds to finance the stocking, for sale at seed time, of such part of their harvest as our Union Board farmers must sell to pay their debts. The first essentials with a Union Board farmer are that he be a good cultivator and that his holding be near a main road. Not all have sufficient funds to be able to afford to hold up for many months such part of their harvest as they do not sell or exchange for seed directly from their threshing floors.

(o) **Work done in connection with Jute Restriction.**—Having been stopped for this year there is nothing to report, but as it will probably have to be taken up again, it is hoped that it will prove possible to allot the funds for purchase of seed in the month of July so that the aus paddy and other substitute seeds may be bought up while low in price and stored until wanted in the following March. During the years in which the scheme has been working the allotment of the money late in the year has undoubtedly raised prices much higher than they need have been as Government officers and cultivators have been competing against each other in a limited market.

Agricultural Education.—The interest taken in this question is increasing and numerous requests and appeals for advice and help were received from M.L.A.'s, School Committees and members of the general public. To most of them we had to reply outlining our scheme of demonstration and pointing out how lack of staff only prevented us from tackling more areas.

There is at Kishoreganj Farm in the Eastern Circle a Primary School which has been run successfully by the Department since 1929 and has now got 49 pupils being taught by two masters. A separate report for the school is published. The question of having it put on a permanent basis is still under consideration.

Acknowledgment for help received.—Thanks are due to many officials and non-officials for help and kindness given to the writer and his staff, but it is felt that it would be invidious to mention certain names and perhaps hurt unwittingly someone who knew that he had done just as much. This record cannot close, however, without giving general acknowledgment or without making particular reference to the loyalty and hard work of the office, district and farm staff.

W. M. CLARK,

*Deputy Director of Agriculture,
Eastern Circle, Bengal.*

APPENDIX I.

A statement showing the staff of the Department and that of the Indian Central Jute Committee and other Bodies in the districts of Eastern Circle.

Name of district.	Departmental Officers.		Number of Agricultural Demonstrators.		Indian Central Jute Committee.		Courts of Ward.		Khas Mahal.	District Scheme.	Other bodies.
	Number of District Agricultural Officers.	Number of Overseers.	Permanent.	Temporary.	Number of Overseers.	Number of Agricultural Demonstrators.	Overseer.	Agricultural Demonstrator.	Number of Agricultural Demonstrators.	Number of Agricultural Demonstrators.	Number of Agricultural Demonstrators.
Dacca Farm	1	4	2	..	..	..	..	..	..	..	..
Dacca ..	1	..	8	1	2	8	..	2	..	..	..
Faridpur ..	1	..	5	1	1	4	..	..	..	..	..
Bakarganj ..	1	..	6	1	..	1	..	..	2	..	6
Mymensingh	1	1	10	2	3	12	..	1	..	..	1
Tippura ..	1	..	3	4	1	4	1	6	2	..	1
Noakhali ..	1	..	4	1	1	4	..	..	..	6	..
Chittagong ..	1	..	6	..	..	..	..	..	4	..	..
Total ..	8	5	44	10	8	33	1	9	8	6	8

Maulvi Habibullah Bhuia, Md. Jalal Ahmed Mia, Md. Akbarazzaman, Maulvi Wazir Ali Chaudhuri, Abdul Latif Khan, Abdus Soban, Bacha Mia, Samser Ali Ahmed of Chittagong.	Patal ..	2.175	New plan- tation.	..	..
	Oat ..	.33	100	..	..
	Peas ..	.48	120	..	..
	Groundnut	4.95	3,149	..	..
	Radish ..	1.77	Sold for Rs. 102-8.	3,808	7
					..

APPENDIX III.

Consolidated statement of the yields of paddy in the Union Board Farms.

Name of district.	Area under aus in acres.	Outturn of aus paddy in lbs.	Quantity of aus paddy stored.	Area under aman in acres.	Outturn of aman paddy in lbs.	Quantity of aman paddy stored.
Dacca ..	22.99	28,940	11,600	14.16	21,140	5,640
Faridpur ..	14.99	15,216	7,300	..	..	..
Bakarganj ..	5.66	5,319	2,256	5.16	6,562	4,633
Mymensingh ..	15.00	20,070	2,680	10.00	18,980	5,120
Jamalpur (Mymensingh).	12.00	17,470	7,600	7.98	15,680	7,600
Tippera ..	15.66	27,493	12,620	9.82	30,174	15,270
Noakhali ..	17.10	14,874	4,296	5.24	9,420	7,672
Chittagong ..	12.00	17,035	8,546	16.66	31,590	18,266
Total	115.40	146,417	56,898	69.02	133,546	64,201

- N.B.*—(a) Average yield of aus paddy per acre—15 mds. 35 srs. (1,270 lbs.).
 (b) Average yield of aman paddy per acre—24 mds. 7 srs. (1,935 lbs.).
 (c) Percentage of aus paddy seeds stored—39.
 (d) Percentage of aman paddy seeds stored—48.

APPENDIX IV.

Consolidated statement of aus and aman paddy in Demonstration Centres.

Name of district.	Quantity of aus paddy produced.	Quantity of aus paddy stored and exchanged.	Quantity of aman paddy produced.	Quantity of aman paddy stored and exchanged.
	Mds. srs.	Mds. srs.	Mds. srs.	Mds. srs.
Dacca	1,975 8	306 10	260 15	147 0
Faridpur	1,424 8	356 15	..	..
Bakarganj	212 35	47 30	746 10	265 0
Mymensingh	1,238 0	574 0	1,883 37	1,068 0
Jamalpur (Mymensingh)	833 10	336 0	367 10	160 0
Tippera	1,979 11	827 31	2,241 17	843 2
Noakhali	1,164 0	118 20	723 37	141 0
Chittagong	828 10	124 20	1,476 7	312 30
Total ..	9,655 23	2,691 6	7,699 3	2,936 32

- N.B.*—(a) Percentage of aus paddy seed stored—28.
 (b) Percentage of aman paddy seed stored—38.

APPENDIX V.

Consolidated financial statement of the seed stores attached to Dacca, Mymensingh, Comilla, Barisal, Faridpur, Kishoreganj and Jamalpur Farms during 1939-40.

Debit.	Rs. a. p.	Credit.	Rs. a. p.
1. Value of articles in stock on 1st April 1939 ..	1,424 14 0	1. Value of purchased articles on stock on 31st March 1940 ..	1,330 13 0
2. Amount of unrealised sale-proceeds due to the seed stores on 1st April 1939 ..	597 12 6	2. Amount of sale-proceeds in hand on 31st March 1940 ..	1 5 0
3. Value of tools and plants on 1st April 1939 ..	683 5 6	3. Value of tools and plants in hand on 31st March 1940 ..	693 8 0
4. Value of furniture on 1st April 1939 ..	95 12 9	4. Value of furniture in hand on 31st March 1940 ..	95 12 0
5. Value of stores adjusted by stock transfer during the year ..	2,938 1 9	5. Amount credited to the treasuries ..	4,290 9 3
6. Purchase of seeds, manures, etc. ..	1,502 12 3	6. Amount adjusted by S. T. and B. T. ..	1,789 3 6
7. Other charges ..	751 7 9		
			<hr/>
			8,201 2 9
	<hr/>		<hr/>
Profit ..	7,994 2 6 207 0 3		
	8,201 2 9		

APPENDIX VI.

Exhibitions and Lantern Lectures.

Name of district.	Names of places of lectures.	Number of lantern lectures delivered.	Average number of cultivators attending the lantern lecture.	Remarks.
Dacca ..	Kanchanpur, Kashinpur and Kalinagar · Bhaganbati, Charsilmandi, Palasona, Hatimara, Mograpara, Nurpur, and Sonatola.	4 ..	425 150	Seven ordinary lectures were delivered.
Faridpur ..	Faridpur Farm, Pangsā, Khagali, Rajbari Farm, Manikdaha, Rajbari Farm, Faridpur Town Hall, Kaijuri, Salda, Ghoserchar, Faridpur Exhibition ground and Madaripur.	12	450	
Bakarganj ..	Odarnkati, Kalikapur, Charmanai, Gournadi, Satura and Pakhuri-jana.	Nil	1,100	Six ordinary lectures were delivered.
Mymensingh ..	Gouripur Bazar, Shalihar, Bakainagar, Musuli, Gafargaon, Tetulia, Daladia.	8	200	
Jamalpur ..	Bonpara, Ramnagar, Shahajpur and Kacharipara.	4	200	
Tippera ..	Manipur, Paschingaon, Daulatganj, Ghornamara, Banasua, Kuchaitala, Conipanyganj and Brahmanbaria.	8	250	
Noakhali ..	Chat Jabbar, Noannai, Noojpur, Sandip, Chaumuhani, Daganbhuia and Feni.	7	840	
Chittagong ..	Sagir Md. ghat, Kalabaria, Monirjhum, Fatehkarkul, Mahara, Changuon, Silonia, Baraidhala, Charandwip, Hyati, Mithachari, Kairbil (Kutubdia), Pomara, Aochia, Chakrasala, Brahmandanga, Cox's Bazar, Jhaldi and Quapara.	Nil	100	Thirty lectures were delivered.

APPENDIX VII.

Statement of Exhibitions held.

Name of district.	Names of Exhibitions where prizes were given at the cost of the Department.	Names of Exhibitions participated in by the Department—no prizes given.
Dacca ..	Kanchanpur and Raipura ..	Nil.
Faridpur ..	Faridpur, Madaripur and Sadarpur ..	Rajbari.
Bakarganj ..	Barisal and Charfasson ..	Nil.
Mymensingh ..	Mymensingh and Netrakona ..	Nil.
Tippora ..	Raipura ..	Nil.
Noakhali ..	Nil ..	Nil.
Chittagong ..	Chittagong and Cox's Bazar ..	Nil.

APPENDIX VIII.

A statement of the supply of improved seeds, manures, cuttings, etc., in the Eastern Circle.

Name of district.	Aus paddy in lbs.	Aman paddy in lbs.	Sugarcane cuttings in numbers.	Darjeeling potato in lbs.	Mustard-cake in lbs.
Dacca ..	27,200	23,580	68,000	5,920	..
Faridpur ..	10,280	3,698	130,000	3,280	..
Bakarganj ..	160	22,675	14,000	2,660	..
Mymensingh ..	27,707	5,330	..	2,160	..
Tippora ..	480	6,072	73,000	3,240	..
Noakhali ..	..	3,200	48,000	3,360	..
Chittagong ..	160	2,800	50,000	8,000	1,360
Jamalpur (Mymensingh) ..	6,575	9,175	73,200	3,240	..

Name of district.	Field peas in lbs.	Patal roots in lbs.	Sulphate of ammonia in lbs.	Artificial farm yard manure in lbs.	Handhoes in number.	Castor-cake in lbs.
Dacca ..	..	..	..	..	..	7,760
Faridpur ..	..	280	165	1,600	5	1,600
Bakarganj ..	144	..	54	..	..	1,708
Mymensingh ..	..	1,860	80	..	..	5,960
Tippora ..	..	500	..	..	..	5,660
Noakhali ..	..	160	620	..	..	2,885
Chittagong ..	5	..	..	..	..	1,440
Jamalpur (Mymensingh) ..	..	..	880	..	..	1,760

APPENDIX VIII—*contd.*

Name of district.	Bonemeal in lbs.	Deep-water paddy in lbs.	Boro paddy in lbs.	Cotton seeds.	Garden peas.
Dacca ..	2,240	..	..	..	..
Faridpur ..	2,800	360	..	..	290
Bakarganj ..	1,420	..	..	..	3
Mymensingh ..	800	..	..	..	..
Tippera ..	3,356	..	..	..	..
Noakhali ..	2,560	..	..	..	105
Chittagong ..	1,920	..	..	..	..
Jamalpur ..	..	..	..	..	..
(Mymensingh).					

Name of district.	Khesari in lbs.	Sonamug in lbs.	English vegetables.	Mustard in lbs.	Lentil in lbs.	Wheat in lbs.
Dacca ..	..	..	Worth Rs. 97-5.	122½	668	80
Faridpur ..	..	..	288 pkts.	10	240	452
Bakarganj ..	2,760	..	2 tolas and 311 pkts.	83	457	..
Mymensingh ..	..	..	373 pkts.	105	422	..
Tippera ..	..	..	384 "	128	610	..
Noakhali ..	..	..	358 "	145	430	..
Chittagong ..	..	..	368 "	58	396	..
Jamalpur ..	..	..	234 "	45	358	..
(Mymensingh).						

Name of district.	Gram in lbs.	Cowpea in lbs.	Maize in lbs.	Linseed in lbs.	Madagascar bean in lbs.
Dacca ..	416	617	312	..	..
Faridpur ..	448	..	120	..	..
Bakarganj ..	451	48	..	12	..
Mymensingh ..	350	..	260	..	..
Tippera ..	504	360	120	44	..
Noakhali ..	438	..	..	..	2
Chittagong ..	276	240	48	..	4
Jamalpur ..	956	..	..	..	..
(Mymensingh).					

APPENDIX VIII.—*concl'd.*

Name of district.	Napier grass cuttings in numbers.	Jute seeds in lbs.	Niciphos in lbs.	Rai in lbs.	Groundnut in lbs.
Dacca ..	13,700	17,020	2,480	..	..
Faridpur ..	..	486	710	39	280
Bakarganj ..	15,000	..	985	..	..
Mymensingh ..	181,500	..	..	..	..
Tippura ..	74,000	20	640	..	315
Noakhali ..	48,000	..	..	..	630
Chittagong ..	36,000	..	2,320	..	560
Jamulpur ..	4,000	46	920	..	40
(Mymensingh).					

Name of district.	Rahar.	Brinjal.	Matikalai.	Rudish.	Tobacco seeds.
Dacca
Faridpur	5	190
Bakarganj	30
Mymensingh
Tippura ..	98	4 tolas	..	..	589
Noakhali	12	82
Chittagong	30	163
Jamulpur (Mymensingh)	55

Name of district.	English vegetables seedlings.	Cigars.	Pineapple suckers.	Paddy seedlings.	Oats. in lbs.
Dacca ..	..	..	..	..	132
Faridpur ..	Worth Rs. 12-9-6	..	..	..	..
Bakarganj ..	17,635	..	..	15 pans	..
Mymensingh ..	..	..	..	..	..
Tippura ..	589	..	..	..	..
Noakhali ..	..	1,000	600	..	..
Chittagong ..	..	..	..	..	..
Jamulpur (Mymensingh) ..	..	..	..	..	..

APPENDIX IX.

Activities of Courts of Ward, Khas Mahals, District Boards and Agricultural Associations in connection with the improvement of Agriculture.

Name of district.	Name of agencies.	Distribution of seeds (Quantities in lbs.).	Distribution of manures in lbs.	Contribution and grants.	Number of Agricultural Demonstrator appointed and maintained, if any.
Dacca ..	Bhowal Court of Wards Estate at Jaydebpur.	Bhasamanik aman paddy .. 1,700	Nil	Rs. 2,500	2
		Latisail aman paddy .. 1,200 Tilakkacherri aman paddy .. 415 Barley .. 15 Gram .. 6 Tori No. 7 .. 412 Matihari tobacco seeds .. 2 oz.			
Faridpur	Khas Mahal ..	Sugarcane cuttings 60,000	Castor-cake .. 1,800 lbs.	400	....
Bakarganj	Ditto ..	Til .. 4 Mug .. 4 Lentil .. 12 Mustard .. 16 Gram .. 30 Groundnut .. 50 Linseed .. 4 Tobacco .. 2½ tolas. English vegetable .. 90 pkts.	Nil	1,345	2

Do.	District Board	Nil	Nil	3,798	6
Mymensingh	Court of Wards Estate, Gayahatta.	Indrasail paddy 475 Tilakkacherri paddy 69 Dudsar paddy 240 Dharial aus paddy 117 Jute seeds 17 Tori 13 Lentil 16 Gram 8 Napier cutting 1,000 mds.	Nil	811	1
Tippura	Court of Wards Estates, Paschingaon, Nargalkote, Naotola, Langeswar, Barakanta Deburduar, Majidpur.	Aus paddy 7,840 Aman paddy 10,160 Deep-water paddy 2,720 Cabbage 20 oz. Cauliflower 32 tolas. Knolkhol 11 oz. Turnip 3 oz. Carrot 10 tolas Beet 4 chh. Brinjal 6 oz. Radish 6,400 lbs. Lettuce 3 oz. Capsicum 2 pkts. Potato 7,500 Peas 8 Tori 400 Mustard 720 Khesari 1,600 Sugarcane 20,000 Linseed 44 Lehtil 106 Groundnut 400 Tobacco 805	Castor-cake .. 2,560 Bonemeal 240	Comilla Nawab's Estate .. 1,650 Paschingaon Estate .. 1,250 Badarannasa Estate .. 2,000 Tagore Estate .. 200 Bhukailash Estate 3,000 Majidpur Estate .. 2,000 Kazi Estate .. 1,500 Total .. 11,600	Overseer Agricultural Demonstrators .. 8

APPENDIX IX—*concl.*

Name of district.	Name of agencies.	Distribution of seeds (Quantities in lbs.).	Distribution of manures in lbs.	Contribution and grants.	Number of Agricultural Demonstrators appointed and maintained if any.
Tippersa ..	Khas Mahal ..	English vegetable .. 13 pkts.	Nil	Rs. 500	....
		Tobacco .. 2 tolas. Potato .. 93 Brinjal .. 4 tolas. Soyabean .. 1 lb. Radish .. 1 Chillio .. 4 Maize .. 5 Groundnut .. 5 Aus paddy .. 40 Aman paddy .. 42			
Do. ..	Rural Reconstruction Society, Brahmanbaria.	Kaktara aus paddy 940 Dharial aus paddy 640 Til .. 350 Tobacco .. 12 tolas. English vegetable .. 85 pkts. Brinjal seeds .. 16 " Palong seeds .. 8 " Capsicum .. 4 "	Nil	420 On account of the pay and travelling allowance of the Agricultural Demonstrator.	1
Noakhali ..	Local Scheme ..	Maize .. 9 oz. Lady's finger .. 3 " Bean .. 1 " Aman paddy .. 656 Rai .. 75 Radish .. 15 Gram .. 152 Groundnut .. 152	Sulphate of ammonia .. 278 Castor-cake .. 1,230	3,580	6

Chittagong	Khas Mahal	..			
Potato	2,460		
Lentil	214		
Beet	1		
Capsicum	1		
Fatal roots	122		
Peas	75		
English vegetable	90 pkts.		
Mathari tobacco	12 oz.		
seeds	12 "		
Bhengi tobacco	15 pkts.		
seeds	1,804		
Tomato	600 Nos.		
Napier grass	12 oz.		
Pineapple suckers			
Brinjal			
Potato	574	Nil	2,056
Tobacco	18,000 Nos.		
Sugarcane cuttings	174		
Groundnut	4		
Radish	1,558		
Aus paddy			

APPENDIX X.

Production of Napier Grass Cuttings in Government Farm and their distribution.

Name of farm.	Quantity grown in lbs.	Quantity distributed in lbs.	
		Free.	On payment.
Dacca	864	Nil	864
Mymensingh	160	Nil	160
Comilla	5,920	5,720	200
Barisal	1,200	960	240
Faridpur	320	Nil	Nil
Kishoreganj	14,360	5,560	8,800
Jamalpur	320	320	..

APPENDIX XI.

Artificial Farm Yard Manure and Silage produced in Government Farm.

Name of Farm.	Quantity of artificial farm yard manure in lbs.	Quantity of silage in lbs.
Dacca	638,400	1,193,920
Mymensingh	16,000	Nil.
Comilla	88,000	Nil.
Barisal	67,240	Nil.
Faridpur	24,240	Nil.
Kishoreganj	2,460	Nil.
Jamalpur	9,600	Nil.
Dhanbari	2,400	Nil.
Charbadna	9,840	Nil.
Rajbari	4,800	Nil.

APPENDIX XII.

A statement of the distribution of Departmental Seeds and Cuttings by sale and free supply during the year 1939-40.

			By sale in lbs.	By free dis- tribution in lbs.
Aus paddy	..	..	29,366	49,106
Aman paddy	..	..	29,324	26,940
Tobacco	..	..	1,104	180
Groundnut	..	..	390	1,100
English vegetables	..	..	48½	2,626 pkts.
Darjeeling potato	..	..	5,880	21,086
Lentil	..	..	1,720	3,020
Gram	..	..	788	3,156
Jute seeds	..	..	162	105
Mustard	..	..	706	524
Sugarcane cuttings	..	..	26,000	486,870
Napier grass cuttings	..	..	210,800	89,175
Peas	..	..	83½	144
Rahar	..	..	98	..
Linseed	..	..	22	12
Maize	..	..	..	700
Cowpea	..	..	505	760
Paddy seedlings	..	.. Rs.	6	..
English Vegetable seedlings	..	.. Rs.	12-9-6	..
Pine-apple suckers	..	..	600	..
Patal	..	..	120	2,780
Madagascar bean	..	..	..	4
Sweet potato	..	..	..	24
Oat	..	..	..	120
Wheat	..	..	..	532
Radish	..	..	..	12

**Annual Report of the Deputy Director of Agriculture, Western Circle,
for the year 1939-40.**

Charge.—During the year under report I joined as Superintendent of Agriculture, Western Circle, on the 1st August 1939 and remained in charge of the office of Deputy Director of Agriculture, Western Circle, from 14th January 1940, taking over from Dr. M. O. Ghani, M.Sc., Ph.D., who held charge from the 2nd May 1939 to the 13th January 1940, when he relinquished the appointment on obtaining a position in the Dacca University. Mr. A. R. Malik, Senior Marketing Officer, Bengal, was in charge from the 1st April 1939 to the 1st May 1939 in addition to his own duties.

Tours.—Mr. A. R. Malik was on tour for 9 days, Dr. M. O. Ghani for 84 days and I toured for 64 days.

Staff.—Babus Utpal Sarkar and Hem Chandra Roy, District Agricultural Officers, Midnapore and Hooghly, respectively, have been substantively appointed in the Subordinate Agricultural Service, Class I, with effect from the 15th March 1939. The addition of these two officers makes the total permanent officers in Class I, Subordinate Agricultural Service, to 8. Five more permanent demonstrators were appointed during the year, making the total permanent strength 27. Their names and postings are noted below:—

1. Munshi Abdul Awal at Dwarbasini (Hooghly),
2. Munshi Enam Ali at Arambagh (Hooghly),
3. Babu Brojendra Nath Samaddar at Bagnan (Howrah),
4. Babu Joy Gopal Das at Dubrajpur (Birbhum),
5. Babu Kanti Prosad Mukherjee at Mahisadal (Midnapore),
now on deputation in the Indian Central Jute Committee,
Babu Bhudeb Chandra Gole is officiating for him.

Babu Bhabesh Chandra Roy, who so long held the post of Assistant Marketing Officer, reverted to his substantive appointment on the 1st March 1940, and joined his duties as Overseer, Chinsurah Farm, with effect from the 11th March 1940, displacing Babu Madhu Sudan Pramanick who reverted to his substantive appointment in the Lower Subordinate Agricultural Service with effect from the same date.

Babu Virarudra Roy, District Agricultural Officer, 24-Parganas, retired with effect from the 4th February 1940.

Babu Hira Lal Dey, Agricultural Demonstrator, Magura (Jessore), died on the 23rd August 1939. Babu Satish Chandra Mondal was appointed in his place and has been working in the vacancy in a temporary capacity with effect from the 21st September 1939.

There has been some transfers of officers during the year under report as will be evident from the following statement:—

Babu Sachindra Krishna Dutt, District Agricultural Officer, Nadia, was transferred to Howrah from the 9th April 1939, having been relieved by Babu Atal Behari Sen, B.Ag. The former officer took over charge from Babu Sujyoti Nath Chatterjee on the 17th April 1939

when the latter was appointed temporarily in the Bengal Lower Agricultural Service as the Propaganda Officer, Department of Agriculture, Bengal.

Babu Virarudra Roy, District Agricultural Officer, 24-Parganas, proceeded on leave preparatory to retirement with effect from the 16th October 1939 and Babu Sujyoti Nath Chatterjee was appointed in his place with effect from the 17th October 1939. The latter again having been appointed as Superintendent of Agriculture, Darjeeling, Kalimpong, was relieved on the 5th March 1940 and Babu Jatindra Mohan Ganguly, Subordinate Agricultural Service, Class II, was appointed in his place and joined on the 13th March 1940 and is still continuing.

Babu Mohini Mohan Ghose, Farm Superintendent, Chinsurah, went on four months' leave with effect from the 4th December 1939 and Babu Jagada Gobinda Bhowmick officiated in his place.

A statement is furnished below showing the relative strength of Agricultural Demonstrators—permanent, temporary and officiating:—

District.	Demonstrators.		
	Permanent.	Temporary.	Officiating.
Bankura	2	1	..
Midnapore	3	3	1
Howrah	2	1	..
Hooghly	3	1	..
Burdwan	1	4	1
Birbhum	4	1	..
Murshidabad	2	..	2
Nadia	3	1	1
Jessore .. .. .	..	5	..
Khulna	2	1	..
24-Parganas	4	..	..
	26	18	5

Temporary staff in connection with the Indian Central Jute Committee:—The following table will show the position of this staff in each district where they are posted:—

District.	Jute	
	Overseer.	Demonstrator.
24-Parganas	1	2
Nadia	1	2
Jessore	1	1
Khulna .. .. .	..	1
Murshidabad .. .. .	..	1
Burdwan .. .. .	..	1
Hooghly .. .. .	..	1
Howrah .. .. .	..	1
	3	10

Character of the season.—The distribution of rainfall was erratic and uneven, and the season was generally not favourable both for either kharif or rabi crops. Owing to late and insufficient rains in May 1939, preparatory tillage for bhadoi crops was much delayed and as such sowing of aus, jute and aman seedbed was practically done in June. There was heavy and continuous rainfall for about a fortnight in the last week of July and the first week of August as a result of which all inter-cultural operations were impossible. The season was, however, favourable for the transplanted aman paddy in the beginning but subsequent heavy precipitation proved harmful, especially on the low-lying plots where the crops suffered a great deal.

As a result of this the cultivation of rabi crops was delayed with the resultant diminution of outturn of crops.

Government Farms.—There are six Government Farms in Western Circle. A resumé of each of these farms is given below :—

(1) **Chinsurah Farm.**—The farm occupies an area of 210 acres of land including buildings, roads, etc. Since the department took over the control again of the Bhuth Nath Pal Agricultural School with effect from the 27th January 1940 an area of 27.90 acres of land out of 46.86 acres allotted to the school has been vested in the Chinsurah Farm to be cultivated from next year.

With the addition of this area the staff for supervision of work in the farm will increase as a matter of consequence. The sanctioned strength of three Overseers for the farm may be restored immediately.

Operations during the year.—This can be grouped in two categories, viz., (1) Experimental and (2) Non-experimental.

Experimental side covers:—

- (a) Manurial experiment with different doses of Nicifos in 4 replications with control plots on aman paddy.
- (b) Complex experiment laid out in 1934 with 4 varieties of aman paddy, viz., Badkalamkati 65, Jhingasail, Latisail and Chinsurah II with different manures.
- (c) Paddy seed experiment at the instance of the Economic Botanist, Bengal.
- (d) Experiment by the Jute Specialist to the Indian Central Jute Committee. Three varieties of Jute (*Olitorius*) were given a trial.

2. *Non-experimental.*—It covers—

- (a) Fodder crops, viz., Joar, Guinea and Napier grass.
- (b) 3 varieties of aus paddy were put under 6.37 acres for multiplication of seeds.
- (c) Growing of 8 varieties of aman paddy.
- (d) Trial of Victor Cowpea and Cotton at the instance of the Second Economic Botanist, Bengal.
- (e) Trial of sunn-hemp for multiplication of seeds under instructions of the Assistant Fibre Expert, Bengal.
- (f) Different rabi crops, viz., Wheat I.P. 52, Lentils, Gram S4, Peas, Matihari tobacco for seeds, Kalai and Khesari.

Fruits and vegetables.—3.44 acres were under this cultivation. A sum of Rs. 57-14-6 was obtained as sale-proceeds.

Sugarcane.—Six varieties of cane were grown. The total yield of gur was 147 maunds 37 seers 15 chittacks.

New crops.—Boro paddy is being tried in the jheel area on 5.77 acres.

Madagascar bean is being tried on 0.10 acres of land.

Improvements.—The eastern boundary has been newly fenced. Ten culverts with valve arrangement have been constructed over the drains. A shed for the engine driver and his mate has been constructed.

Artificial farmyard manure.—About 1,193 maunds of manure was prepared and 800 maunds used during the year.

Cultivation on economic basis.—15.72 acres were devoted to this cultivation.

Cattle.—There were 60 bullocks at the beginning of the year, out of which one died of foot-and-mouth disease and 14 bullocks became unserviceable and were sold off. Nine bullocks were purchased during the year, making the total herd of cattle 54 at the end of the year.

Practical training in Agriculture.—One Apprentice was under training during the year.

Berhampore Farm.—The farm, commonly known as Company Bagan, occupies an area of 43.92 acres, of which 18.47 acres were cropped twice excluding the area of 4.69 acres under Sugarcane for 1940-41.

Babu Amitava Sen was in charge of the farm throughout the year. He was helped by one Overseer and one clerk.

Operations during the year.—(1) The experimental work consisted of—

- (a) Varietal test of aus paddy of the Economic Botanist, Bengal—9 medium and late varieties and 5 early varieties.
- (b) Varietal test of groundnut under the guidance of Oil-seeds Specialist, Madras.
- (c) Varietal test of sugarcane under the guidance of the Agricultural Chemist, Bengal.
- (d) Madagascar bean,
- (e) Different seed rates of flax.
- (f) Linseed.
- (g) Tobacco for multiplication.
- (h) Agave.
- (i) Millet under instructions of Second Economic Botanist, Bengal.
- (j) Cotton 289F under instructions of the Second Economic Botanist, Bengal.

2. Non-experimental—

- (a) Varietal test of aus paddy.
- (b) Varietal test of sugarcane.
- (c) Jute C. G. for multiplication of seeds.

- (d) Four varieties of groundnut.
- (e) Maize for fodder.
- (f) Napier grass grown on 1·20 acres. The quantity of fodder obtained was 547 maunds 15 seers besides 61 maunds of cuttings.
- (g) Wheat I.P. 52.
- (h) Linseed B26 was grown for seed.
- (i) Lentil No. 5.
- (j) Gram I.P. 58.

Cultivation on Economic Basis.—Sugarcane and linseed were grown as economic crops.

Cattle.—There were 6 pairs of bullocks in the beginning of the year, of which 2 died during the year. A pair of new bullocks has been purchased.

Practical training in agriculture.—Nil.

3. **Krishnagar Farm.**—The farm occupies an area of 46·3 acres, of which 30·80 acres are under cultivation, the rest being occupied by roads, buildings, tanks, etc.

Charge.—Babu Atal Behari Sen remained in charge of the farm throughout the year. The area under cultivation is as under:—

			Acres.
Experimental	...	...	4·78
Non-experimental	...	...	18·51
Economic area	...	...	7·51
	Total	...	30·80

Operations during the year.—(1) Experimental side included—(a) Varietal test of aus paddies, (b) Varietal test of groundnut, (c) Agricultural Chemist's Moisture experiment on the soil with the application of different manures, (d) varietal test of sugarcane, (e) Cotton, (f) Madagascar Bean, (g) Mung and Kalai experiments.

(2) Non-experimental side—3 varieties of aus and Badkalamkati 65 aman were grown besides fodder and other rabi crops.

Cultivation on Economic Basis.—An area comprising 39 bighas 2 kathas 8 chittacks on double cropping was put under crops on economic basis during the year.

Cattle.—There are 5 pairs of bullocks for the farm and 2 pairs of bullocks for the Horticultural Section. Besides there were 7 bullocks for the Animal Nutrition Section. There was a stud bull in the farm, and this was sold by auction due to senility. One pair of young bullocks was purchased to replace the old ones.

Practical training in agriculture.—One cultivator's son was under training who acquired practical experience in all the farm operations.

4. **Suri Farm.**—This farm comprises an area of 33·26 acres of which 22·44 are under cultivation; the remaining area being occupied by roads, drains, buildings, tanks, etc.

Babu Jogendra Chandra De was in charge of the farm throughout the year under report.

Operations during the year.—(1) Rice Research Work; (2) Experimental cultivation.

(1) *Rice Research work.*—As heretofore an area of 4·3 acres of land was set apart for conducting experiment by the Rice Research Officer, Bankura, under the direct control of the Economic Botanist, Bengal.

(2) *Experimental Cultivation.*—(a) Manurial experiment under the direction of the Agricultural Chemist, Bengal, (b) experiment with cotton in irrigated and non-irrigated areas under the direction of the Second Economic Botanist, Bengal.

Besides, the following crops were tried:—Rahar (Economic Botanist's selected type No. 6·20), Early (Bankura) Rahar, Matihari tobacco, Co. 213 Sugarcane, Groundnut A. 11. 18, Vegetable for demonstration.

Cultivation on economic basis.—The soil of the farm is still poor for the successful cultivation of crops, though the textural composition is gradually improving. 0·4 acres comprise the economic area.

Ensilage.—The green plants of Joar and Cowpea crops were put into silo pits for ensilage. The stuff is now given to the cattle:—

			Mds.	srs.
Silo pit No. 1	...	...	116	0
Silo pit No. 2	...	...	134	7
			<hr/>	
	Total		250	7
			<hr/>	

Artificial farmyard manure.—480 maunds of this manure was prepared and brought into use, besides 300 maunds left prepared for next year's use.

Fishery.—19 seers 3 chittacks of fish were caught from the tank and sold.

Cattle.—The herd consists of 4 pairs of bullocks and 1 stud bull. The bull died from the effect of foot-and-mouth disease. Thirty cows were served by this bull. One bullock died and 2 bullocks became old and unserviceable. They were replaced by purchase from the Hiranpur hat in the Santhal Parganas.

Bankura Farm.—The total area of the farm is 29 acres, of which 10·10 acres are occupied by buildings, tanks, roads, farm steading, etc., the rest 18·90 acres being under cultivation.

Charge.—Mr. Promatha Nath Ganguly held charge of the farm throughout the year under report.

The area under cultivation may be divided as follows:—

					Acres.
(i)	Area under experimental plots	..	..	..	2·00
(ii)	Area under demonstration plots	..	..	..	6·30
(iii)	Area under economic basis	..	..	..	0·60
(iv)	Area under Rice Research work	..	..	..	10·00
					<hr/>
					18·90
					<hr/>

The farm badly needs extension of some acres of high land for the rotation of Sugarcane, Cotton, Groundnut, and for the cultivation of fodder and rabi crops.

Operations during the year.—

(1) Sugarcane was grown on 0.60 acres of land. The crop did not do too well; still 38 maunds 23 seers 2 chittacks of gur and 29,900 cuttings were obtained.

(2) Napier grass was under 1.30 acres. 406 maunds of fodder was obtained and gave 3 cuts during the year.

(3) Maize and cowpea. 210 maunds of fodder was obtained.

(4) Joar gave fodder 123 maunds 9 seers.

(5) Cotton 289F and C. O. 2. The picking is still going on.

				Area.	Outturn.
(6)	Chhatra Rahar	..	..	0.075	34 seers.
(7)	Broadcast Dhairai aus paddy	..	..	0.58	24 maunds per acre
(8)	Aus paddy, Bhutmuri	..	..	1.00	29 maunds per acre.
(9)	Aman paddy, Badkalamkati	65	..	0.65	32 maunds 27 seers per acre.
(10)	Castor	..	..	0.17	(not harvested).
(11)	Tobacco, Matihari	..	..	0.10	27 tolas of seeds were obtained.
(12)	Wheat	..	..	0.20	10 maunds per acre.
(13)	Gram, Sabour	..	..	0.20	10 seers (crop failed).
(14)	Lentil	..	..	0.20	33½ seers.
(15)	Mustard T7	..	..	0.30	15 seers.
(16)	Mustard R5	..	..	0.30	Attacked with insects.
(17)	Poas	..	..	0.25	1 maund 11 seers.
(18)	Groundnut A. H. 18	..	..	..	23 maunds 25 seers per acre.
(19)	Cowpea	..	..	0.75	85 maunds of fodder and 1 maund 22 seers seed failed.
(20)	Cowpea	..	..	0.30	

Fruit Research Work.—The Economic Botanist had started a small orchard area from last year. Owing to severe drought litchie plants were all damaged. Nine litchie and 13 more female grafts from Dacca farm and 12 grafts of Rangpur oranges were brought and planted.

Cultivation on economic basis.—0.60 acre of Sugarcane was grown on economic basis.

Cattle.—There are 4 pairs of bullocks, out of which one pair is old and infirm. A pair of new bullocks has been purchased during the year. There is a stud bull in the farm and the service is free. The bull served 43 cows during the year.

Artificial Farmyard Manure.—800 maunds of this manure were prepared and utilised on the farm crops.

Practical training in Agriculture.—No one amongst the cultivators' sons came in for training. The Gurus of the Local Guru Training School were frequently shown round as to what is going on here.

Burdwan Farm.—The farm has an area of 35 acres, of which 26.137 acres are under cultivation, the rest of the land being occupied by drains, roads and buildings.

It was established through the munificence of the Burdwan Raj in the year 1895. In 1921 the control and management of the farm was transferred to the Agricultural Department. The Burdwan Raj contributes an annual grant of Rs. 2,800 towards its maintenance.

As the Burdwan Raj does not wish to contribute this sum any more and intends to divert it towards the improvement of its Khas Mahal lands, the Agricultural Department is on the look-out of a suitable site for the establishment of an Agricultural Farm.

Babu Santosh Behari Bose remained in charge of the farm throughout the year.

The following crops were grown:—Aus paddy, aman paddy, Nagra paddy, Sugarcane, Cowpea, Napier grass, Saboi grass and Dhaincha green manure to improve the texture of the land. Varietal experiment with aus and aman paddies selected by the Economic Botanist, Bengal, and Agricultural Chemist's sugarcane experiment were conducted. Saboi grass being cultivated on the farm for the last five years does not give promise of success on account of unsuitability of land.

Napier grass.—It was grown on 0.95 acres. 49,000 (49 maunds) cuttings were supplied in the district and 61½ maunds were fed to farm cattle.

Cattle.—There are three pairs of bullocks on this farm.

Cultivation on economic basis.—This year the whole of 18.24 acres under the non-experimental aman paddy was shown under the head "Commercial".

Artificial Farmyard Manure.—Four heaps weighing about 581 maunds were prepared, of which 281 maunds 10 seers was applied to farm crops, and the rest will be utilised in the next year.

In the year 1938 the Department took over the land of the Detenus' Training Camp at Maslandpur (24-Parganas) which was formerly under the management of the Industries Department. No crop was grown in that year. But in the beginning of July 1939, on receipt of Government sanction some portions of the land out of the total of 500 bighas was let out to the local cultivators on barga system after execution of an agreement. Jute, aman paddy, lentil, potatoes, English vegetables and linseed were grown but the result obtained was not reassuring. Rank vegetations such as, kush, mutha grass, kans grass made their appearance after sowing of the seeds, and this retarded and hampered the growth of crops. The proper laying out of the entire area and reclamation are essentially needed.

Private Farms.—Of all the private farms in Western Circle the Gosaba Farm stands out prominently especially in its scientific way of cultivation of crops. One Agricultural Officer in the cadre of Subordinate Agricultural Service, Class II, is maintained in the farm at Departmental cost, while the cultivation cost of crops is borne by the Estate of the Late Sir Daniel Hamilton. The total area of the farm is 12 acres, of which 10.17 acres were under cultivation, the rest being occupied by roads, tanks, buildings, etc. Babu Nani Gopal Burman-Roy remained in charge of the farm throughout the year. All crops, as grown in Government farms, are grown of which varietal test of Patnai paddy (Gosaba 23) conducted under the guidance of Economic Botanist, Bengal, occupies a remarkable place.

Demonstration Programme.—Union Board Farms.—There were altogether 44 Union Board Farms in Western Circle during the year under report or an increase of 7 over last year.

A statement showing the crops grown and the results obtained per district will be found in Appendix I.

A sum of Rs. 4,270 was provided for running these Union Board Farms and a sum of Rs. 4,259-2 was actually spent for the purpose.

Seed golas were constructed in each of the new Union Board Farms as also manure pits in all the farms out of the above allotment.

Subsidy on paddy seeds.—This is the second year since this system of giving premia to stockists for sale of Departmental strains of improved paddies for sowing purpose was introduced. A premium ranging from 8 annas to 4 annas for aus and 4 annas to 2 annas for aman was given with the object that the stockists or distributors must keep the seeds pure and unmixed from the local varieties. The system has worked on well and it afforded a good stimulus to the stockists and other Union Board Farm owners in the utility of preserving these Departmental paddy-seeds for sowing purpose. It has not only come to our aid in increasing the area under Departmental paddies of better strain but has served the purpose of automatic expansion as well. Conditions governing the grant of premia are:—

- (1) That seeds must be of reasonable purity and viability.
- (2) That seeds must be of Departmental race and origin.
- (3) That the seed is being used for seed purpose.

The golas in which the seeds are stored are periodically examined by the staff of the Agricultural Department to guard against their mixture with local paddies. A sum of Rs. 1,100 was provided for this premium and the total quantity over which this was given was for 3,300 maunds of aman and 1,100 maunds of aus paddies.

Private Farms.—A list of seed-farms is furnished below. It is unfortunate that when any emergency arises due to flood or any adventitious circumstances we cannot exploit the stock held by these seed-farm owners for supply owing to the admixture of different varieties of paddy.

Berhampore.—(1) *Farm of Ramnugger Cane and Sugar Company, Limited.*—This is mainly a sugarcane farm. The area under the crop was 4,000 bighas. Almost all the recommended varieties of cane are found here.

(2) *“Kamalavatan” of Babu Birendra Nath Mukherjee.*—Departmental types of crops are grown here. The farm has been so banded up as to provide facilities for irrigation from the stream which flows through the area in a winding course. Badkalamkati and groundnut were grown.

(3) *Farm of Nashipore Raj.*—Paddy, groundnut, gram, mustard, lentil, rahar, etc., were grown on a large scale.

(4) *Farm of Rai J. N. Choudhury Bahadur of Nimtita.*—Varieties of kharif and rabi crops of Departmental strains are cultivated in this farm.

(5) *Farm of Dr. B. D. Mukherjee at Simulia.*—The crops grown are —Indrasail, aman paddy, Co. 213 sugarcane, potato, tobacco, English vegetables, Napier grass, wheat and others. A centrifugal pump is

worked by an Engine 8 B.H.P. for irrigation of crops. Gur is manufactured in a Mcglashan Furnace.

(6) *Farm of Maulvi Sakwat Hossain at Saktipore.*—The farm is situated on the north-western edge of Beel Karul and is bunded to ward off water of the beel.

Jessore.—(1) Gadgachi farm of Babu Mani Mohan Bhattacharjee, P. O. Jangalbadal.

(2) Chapali Farm of Babu Jatindra Nath Ghose, P. O. Naldanga.

(3) Majitpur Farm of Babu Monoranjan Ghose, P. O. Keshabpur.

(4) Majipara Ideal Agricultural Farm of Babu Panchanan Roy of Ghoja, Bongaon.

(5) Jhenidah Farm of Babu Amulya Charan Moulik, B.L.

Khulna.—Babu Haripada Biswas, President, Barrackpur Union Board, procured 50 maunds of Tilakkachary paddy from the Department. All seeds were distributed in the Union.

Howrah.—(1) Babu Aniruddha Bhatta of Lilloah is the owner of a 1,000 bigha farm. Aman paddy, jute, tobacco, potato, English vegetables, lentil, Khesari are grown. A stud bull is maintained.

(2) Babu Sudhir Prosad Karuri of Makardah—area 20 bighas.

(3) Babu Atindra Nath De, Kona, P. O. Howrah—area 20 bighas.

(4) Babu Ramjiban Guchait, Ayma, Shyanpur—area 20 bighas.

(5) Babu Prankrishna Jana, Bhagwanpur, Shyampur. Keeps a stud bull.

Birbhum.—(1) Sultanpur Farm—150 acres—Rai Bahadur A. C. Banerjee. C.I.E.

(2) Sultanpur School—10 acres.

(3) Sankarpur Farm—150 acres—Molla family of Sankarpur.

(4) Labpur Farm—150 acres—Babu N. N. Banerjee of Labpur.

24-Parganas.—(1) The Barrackpur farm of Mr. J. N. Gupta (Retired I. C. S.), comprising an area of 100 bighas, has been taken over by the University of Calcutta for the purpose of imparting practical training in Agriculture and Horticultural Courses to young middle class youths.

(2) Demonstration farm and activities of Port Canning Zemindary Company, Limited. The Company maintains one Overseer and 3 Agricultural Demonstrators and is the owner of 3 Demonstration Farms at Palharkhali, Ramchandra Khali and Amghora. The main work of these farms is the multiplication of Departmental strains of paddies and distributing them to the cultivators at cost price.

(3) The Bengal Central Agricultural Farm at Kamdebkati in Baraset subdivision. It is a mixed farm of agriculture, dairy and poultry.

(4) Diamond Harbour Poultry Farm at Diamond Harbour.

Hooghly.—(1) Makalpur Farm of Babu Monmohan Sinha Roy.

(2) Jangipara Farm of Babu Brindaban Singha Roy.

(3) Serampore Farm of Babu Kanai Lal Goswami, M.L.C.

(4) Chawbera Farm of Babu Chandra Mohan Mukherjee.

Bankura—

Name of farm.	Name of owner.
1. Rajagram	... Alokendra Nath Bose.
2. Gobindapur	... Jnan Sundar Ghose.
3. Supur	... Rakhal Chandra Kundu.
4. Mandiha	... Bijoy Narayan Hazra.
5. Makarkole	... Mohendra Dana.
6. Chabra	.. Baidya Nath Chandra.
7. Onda	... Bhudeb Bose.
8. Banshi	... Hari Nandi.

Seed Stores.—Each of the Government farms maintains a seed store for supply of pure and improved strains of seeds, chemical and organic manures and implements recommended by the Department to the public.

The following table shows the expenditure and receipts:—

Name of seed store.				Total expenditure during 1939-40.	Total receipts during 1939-40.
				Rs. a. p.	Rs. a. p.
1.	Chinsurah	..	..	788 2 0	3,636 8 8
2.	Berhampore	..	..	270 0 0	2,162 14 9
3.	Krishnagar	..	..	106 5 0	676 13 9
4.	Suri	..	..	64 11 9	71 0 0
5.	Bankura	..	..	55 7 6	344 10 3
6.	Burdwan	..	..	28 8 0	21 13 0

Private seed stores.—*Bankura.*—There is a seed store maintained by the District Agricultural Association, Bankura, which supplied during the year 130 mds. of Darjeeling seed potatoes to the cultivators at a reduced rate and some summer and winter season vegetable seeds.

Khulna.—There is one small private seed store under the name "Laskar Nursery."

Demonstrations.—There were 118 Demonstration Centres in Western Circle during the year. A sum of Rs. 6,225 was provided for the purpose and an expenditure amounting to Rs. 6,210-11 was spent. The season was on the whole not propitious both for kharif and rabi crops. Heavy and incessant rainfall at the end of July and beginning of August did much damage to paddy crops. Preparatory operations for the cultivation of rabi crops could not be undertaken owing to adverse weather conditions and the cultivation did actually commence in the month of November with the result that satisfactory outturn of crops could not be obtained.

Results of all crops grown are furnished in Appendix II.

Lectures.—Opportunities were availed of by the officers in delivering lectures among interested persons while out on tour in meetings of Union Boards, Rural Welfare Units and similar other organisations. The District Agricultural Officer, 24-Parganas, delivered lectures on Agriculture to 60 Circle Officers in the Bishnupur Training Camp under the supervision of the Director of Rural Reconstruction for about a month. Several lectures attended with magic lantern were delivered.

Exhibitions.—A statement (Appendix III) is enclosed herewith showing the Exhibitions held in each district.

In the exhibitions the Department participated, sanctioned Departmental contributions besides grants for purchase of articles to be given

as prizes to the best exhibitors in the shape of Bengal or Sobkam ploughs, nicifos, bonemeal manures, spades, watering cans, Stanley's Garden Tools, etc.

A sum of Rs. 2,750 was provided for prizes and an expenditure of Rs. 2,200 was incurred.

Khas Mahal Farm.—There is one Khas Mahal Farm at Jessore, the area of which is 5 acres of which 3·5 acres are under cultivation. The use of improved implements, the application of different kinds of manures and their effect on crops, the preparation of water-hyacinth compost and artificial farmyard manure, conservation of cowdung in manure pits, the preparation of silage, etc., are demonstrated to the public.

The Khas Mahal of Hooghly made some contribution towards purchase of seeds and manures.

A list of their purchase is given below:—

	Rs.	a.
English vegetable seeds	...	15 0
Dhairal aus paddy 3 maunds	...	9 0
C. G. Jute seeds 3 seers	...	3 0
Gosaba 23 aman 20 maunds	...	58 13
Jhingasail aman 20 maunds	...	60 0
Bonemeal 40 maunds	...	130 0
		<hr/> 276 13

Total amount spent by the Khas Mahal in Hooghly district was Rs. 800.

The Khas Mahal Estates of 24-Parganas maintain one Demonstrator with headquarters at Mansadwip. The following crops.—Charnock aus, Dhairal aus, Gosaba 23 aman, Napier grass, Epicure Scotch potato, Darjeeling and Nainital potatoes, English vegetables, onions, garlic, groundnut, tobacco, peas, mustard, khesari and masur were grown.

The Collector of Bankura spent a sum of Rs. 50 for the improvement of Government Estates by distributing free 20 maunds of aman paddy seeds among the Khas Mahal tenants of Beliarā during the year.

Wards' Estates.—There is an Agricultural Farm at Makimpore (Jessore) under the Janbazar Wards' Estate. The Departmental improved crops are grown there.

Hooghly.—As in previous years, due to the active interest taken by Babu Kamada Charan Sanyal, Manager, B. L. Mukherjee's Estate, funds on a liberal scale were provided for agricultural work, as below:—

Heads of expenditure.	Amount provided.	
	B. L. Mukherjee Estate.	P. Mukherjee Estate.
	Rs.	Rs.
1. Pay of a joint Demonstrator	216	144
2. Travelling allowance	30	84
3. Free distribution of seeds and manures	400	200
4. Contingencies	15	10
5. Grant for poultry	150	..
Total ..	<hr/> 811	<hr/> 438

Bankura.—The Raha Wards' Estate at Vishnupur spent a sum of Rs. 2,000 for the improvement of agriculture by maintaining an Agricultural Demonstrator at Rahagram and distributing improved seeds, manures and implements to the tenants of the Estate free of cost.

24-Parganas.—The Bhowanipur Wards' Estate maintains one Demonstrator with headquarters at Sangrampur Kachari. He is in charge of three Demonstration Centres. The following crops were grown:—Gosaba 23 aman paddy, Napier grass, Epicure potato, Darjeeling and Nainital potatoes, English vegetables, onion, garlic, groundnut, tobacco, mustard, peas, til, khesari, lentil and sugarcane.

The R. M. Roy Wards' Estate and Panihati Wards' Estate each maintained one Demonstrator.

Midnapore.—The following Wards' Estates, viz., Basudebpur, Ballishahi and Naren Pahari, each maintained one Agricultural Demonstrator with their headquarters at Basudebpur, Ballishahi and Mukundapur throughout the year. The estates have spent Rs. 2,000, Rs. 1,100 and Rs. 640 respectively. The schemes of agricultural improvement in all the estates were identical and consisted of demonstrations with improved seeds, manures and methods in cultivators' own lands.

District Boards.—The District Board of Bankura has given a contribution of Rs. 100 to the District Agricultural Association, Bankura, for utilising them for the improvement of agriculture in Bankura district.

The District Board of Howrah placed a sum of Rs. 300 at the disposal of the District Agricultural Association for agricultural improvement.

Agricultural Associations.—As in previous years the District Agricultural Associations are still keeping up a moribund existence through lack of funds. The District Boards of Howrah and Bankura made a grant of Rs. 300 and Rs. 100 respectively to the respective District Agricultural Associations and what these Associations did with the money are set forth below:—

Howrah District Agricultural and Welfare Association.—The following seeds were distributed:—

1. Cocoanut seeds	..	..	300 Nos.
2. Queen South India pineapple suckers	..	..	120 „
3. Banana suckers	..	..	60 „
4. Contai Radish seeds	..	..	3 seers.
5. Darjeeling Redround potato	..	..	7 mds.
6. Tomato seeds—large red	..	..	2 lbs.

Bankura District Agricultural Association.—The Association has supplied 130 maunds of Darjeeling seed potatoes to the cultivators of the district at a reduced rate. Besides Summer and Winter season vegetable seeds were also sold at concession rates.

Birbhum District Agricultural Association.—During the year under report the following improved paddy seeds were purchased and supplied to the cultivators:—

					Mds.	Srs.
Paddy seeds	..	Badkalamkati 65	..	..	36	14
		Bhasamanik	..	..	37	9
		Latisail	..	..	0	22
		Charnock	..	..	1	0
		Nonaramsail	..	..	2	20
		D × I	..	..	1	20
		Boldar	..	..	5	0
		Sindurmukhi 199	..	..	0	12
Joar seeds	..	..	..	..	0	16

and vegetable seeds, viz., tomato, cauliflower, cabbage, knolkhol, turnip and beet.

The Murshidabad District Agricultural Association spent Rs. 205 and Rs. 62-8 for purchase and distribution of groundnut and potato seeds respectively through the Subdivisional Officers.

Free distribution of seeds.—A Statement (Appendix IV) is enclosed herewith.

Growing of Napier grass and manufacture of artificial farm yard manure.—The cultivation of Napier grass is spreading apace and it has caught on the imagination of the people as a valuable fodder crop. It was grown in all Government Farms as well as in Union Board Farms and Demonstration Centres.

Artificial farmyard manure was manufactured as above. A Statement (Appendix V) is enclosed showing the yield obtained and quantity distributed.

Substitute crops of jute.—Nil.

Co-operative Agricultural and Irrigation Societies.—There are working 273 co-operative irrigation societies in Bankura district.

Mustard Multiplication Scheme.—Two temporary Demonstrators were appointed for six months in the districts of Murshidabad and 24-Parganas for the purpose of distributing seeds to the parties concerned and supervising the growing of the same in the selected centres of Nimtita and Basirhat. The man for Murshidabad district was appointed with effect from the 1st October 1939 and the man for 24-Parganas district from the 1st September 1939. The seed was distributed free. The following were the conditions:—

- (1) The grower must not grow in his land any other type of mustard than the one distributed.
- (2) All the seeds must be sold to the Agricultural Demonstrator after harvest and after one thorough dryage.
- (3) The growers would get the local market rate for the produce sold plus annas four per maund as premium for keeping the seed pure and of approved germination.

About 200 maunds of seeds has been kept reserved for distribution in 11 districts in Western Circle.

Agricultural Education.—The Bhutnath Paul Agricultural School at Chinsurah was closed during the year under report and the management and control has reverted to the Government. Babu Raj Nath Roy, a retired officer of the Bengal Lower Agricultural Service, has temporarily been appointed as the Head Master of the School. The students of the now defunct B. N. Pal School have been allowed to continue in the second year class.

There are 13 High English and 12 Middle English Schools, where agriculture is taught in the districts.

Irrigation Scheme.—Nil.

Indian Central Jute Committee.—Statistical information on Jute in prescribed form was collected through the Jute staff and submitted to the Director of Agriculture, Bengal and Secretary, Indian Central Jute Committee, as the case may be.

Acknowledgment.—It is gratifying to note that an increasing number of officials and non-officials assist the Department in its numerous activities and it is not possible to acknowledge each and all individually. A few amongst many is mentioned below who collaborated in our activities for the improvement of agriculture:—

1. Mr. B. R. Sen, I.C.S., District Magistrate, Midnapore.
2. Rai N. C. Bose Bahadur, District Magistrate, Jessore.
3. Mr. S. K. Haldar, I.C.S., District Magistrate, Bankura.
4. Mr. K. A. L. Hill, I.C.S., District Magistrate, 24-Parganas.
5. Babu Monmohan Sinha-Roy, Vice-President, Hooghly District Agricultural Association, and Zemindar of Makulpore.
6. Rai A. C. Banerjee Bahadur, C.I.E., Sultanpur (Birbhum).
7. Maulvi Md. Shamsuddin, M.A., Deputy Magistrate, Bongaon (Jessore).
8. Raja Jogendra Narayan Saha Roy of Lalgarh (Midnapore).

The District Agricultural Officers and their subordinate staff had a very strenuous time on account of extensive demonstration programme, the supply of paddy seeds and seedlings during the last flood and the work of the Indian Central Jute Committee carried on during the year and I take this opportunity of acknowledging their services. The names of Babus Sontosh Behari Bose and Utpal Sarkar may be specially mentioned in this connection.

The office staff which was only recently brought up to strength tried their best to cope with the rapidly increasing office work. The work of the Head Clerk, Babu Dharmadas Chakravorty, who is retiring in the near future after a long and useful service, deserves mention.

S. C. ROY,

*Superintendent of Agriculture,
in-charge of Western Circle.*

APPENDIX (I).

Consolidated statement showing the Agricultural Operation undertaken during the year 1939-40.

Name of districts.	Number of Union Board Farms.	Particulars of crops grown.	Area.	Outturn.	Total sale-proceeds.	Cost.	Remarks.
			B. k.	Md. sr. ch.	Rs. a. p.	Rs. a. p.	
24-Parganas ..	4	Charnock aus ..	12 0	88 15 0	265 2 0	120 0 0	
		Napier grass ..	4 0	500 0 0	125 0 0	40 0 0	
		Jute ..	4 0	27 0 0	360 12 0	80 0 0	
		Groundnut ..	4 0	23 10 0	116 4 0	36 0 0	
		Patnai aman ..	18 0	235 10 0	705 12 0	180 0 0	
		Chinsurah No. 11 ..	6 0	95 0 0	285 0 0	60 0 0	
		Tobacco ..	4 0	10 15 0	83 0 0	36 0 0	
		Wheat ..	4 0	9 25 0	57 12 0	24 0 0	
		Gram ..	8 0	34 35 0	174 6 0	40 0 0	
		Linseed ..	4 0	10 25 0	58 7 0	22 0 0	
		Maize ..	4 0	400 0 0	100 0 0	20 0 0	
		Cowpea ..	4 0	200 0 0	50 0 0	16 0 0	
		Dhaincha ..	32 0		Green manured.		
		English vegetables ..	2 0	..	123 10 0	60 0 0	
		Potato ..	2 0	97 25 0	268 7 6	40 0 0	
		Lentil ..	8 0	29 30 0	119 0 0	40 0 0	

APPENDIX (I)—*contd.*

Name of districts.	Number of Union Board Farms.	Particulars of crops grown.	Area.	Outturn.	Total sale-proceeds.	Cost.	Remarks.
			B. k.	Md. sr. ch.	Rs. a. p.	Rs. a. p.	
Nadia	4	Dharial aus paddy	12 0	64 32 0	138 10 0	..	
		Backalamkati aman	8 0	54 5 0	148 4 0	..	
		Jhingashal aman	16 0	66 38 8	187 8 0	..	
		C. G. Jute	4 0	12 0 0	117 0 0	..	
		Groundnut	2 0	2 4 0	10 8 0	..	
		Rhar (Comilla)	3 0	9 15 8	28 4 0	..	
		Gram	16 0	46 12 8	131 15 0	..	
		Lentil No. 5	4 0	6 35 0	21 2 0	..	
		Tori No. 7	8 0	5 15 8	26 19 0	..	
		Rai No. 5	2 0	0 35 0	4 6 0	..	
		Linseed	2 0	5 13 0	29 15 0	..	
		Pusa wheat 52	2 0	5 25 0	19 2 0	..	
		Darjeeling potato	2 0	46 2 0	95 0 0	..	
		Tobacco (Motihari)	2 0	4 30 0	67 0 0	..	
		English vegetables	2 0	..	115 0 0	..	

Jessore	5	Dhaincha green manure	2 0			..	..			..	Damaged.
			4 0	2 0	240 20 0		35 0 0	..	..
		Jowar (Fodder)	..					..	..
		Napier (Fodder)	..		57 0 0		11 2 0	..	..
		Aus paddy	..	19 0	101 0 0		215 8 0		160 0 0	1 bigha damaged.	
		Aman paddy	..	11 10	68 10 0		77 6 0		144 0 0	13½ bighas damaged.	
		Jute	..	5 0	32 0 0		384 0 0		150 0 0		
		Maize	..	0 10	55 0 0		8 2 0		12 8 0	2 bighas damaged.	
		Napier grass	..	0 10	126 18 0		31 10 0		25 0 0	Ditto.	
		Gram	..	8 0	21 20 0		86 0 0		50 0 0	Ditto.	
		Lentil	..	5 0	13 19 0		53 14 0		25 0 0		
		Potato	..	5 0	208 20 0		563 12 0		290 0 0		
		Groundnut	..	5 0	5 10 0		30 0 0		40 0 0		
		Tobacco	..	2 0	4 20 0		60 8 0		60 0 0	10 cottahs damaged.	
		Linseed	..	5 0	8 25 0		42 8 0		20 0 0		
		Cauliflower	..	507 in num- ber.							
		Cabbage	..	749 in num- ber.							
		Knolkhol	..	2-10 450 in number.	..		86 5 6		125 0 0		
		Turnip	..	480 in num- ber.							
		Pea	..	3 ars.							
		Tomato	..	6 mds. 5 ars.							
		Juar	..	0 10	..		..		..

APPENDIX I.
Consolidated statement showing the Agricultural Operation undertaken during the year 1939-40.

Union Board Farm.

Name of districts.	Number of Union Board Farms.	Particulars of crops grown.	Area in acres.	Output.	Total sale-proceeds.	Cost.	Remarks.
				Mds. strs. ch.	Rs. a. p.	Rs. a. p.	
Burdwan ..	5	Charnak aus paddy ..	56	21 0 0	52 8 0	20 0 0	Bardanga U. B. Farm, Nil.
		Bedkalankati aman ..	2.68	77 0 0	192 8 0	80 0 0	
		Chinsurah No. 2 ..	3.66	106 30 0	381 14 0	170 0 0	
		Jhingsail aman ..	3.66	119 34 0	299 10 0	110 0 0	
		Patnai-23 ..	6.66	2.6 0 0	678 0 0	200 0 0	
		Dutisar aman paddy ..	1.66	60 0 0	150 0 0	50 0 0	Grown at Sresurah U. B. Farm.
		Sugarcane ..	1.33	140 0 0	700 0 0	224 0 0	
		Napier grass ..	1.33	300 0 0	Fed as fodder.	20 0 0	
		Joar ..	2.00	700 0 0	Do.	30 0 0	
		Groundnut ..	.1	3 10 0	26 0 0	2 8 0	Grown at Bardanga U. B. Farm.
		Potato ..	1.66	260 0 0	650 0 0	200 0 0	
		Wheat ..	1.82	25 8 0	151 3 0	30 12 0	
		Gram ..	1.66	16 16 0	65 9 6	25 0 0	
		Lentil ..	1.49	12 30 0	63 12 0	15 0 0	
		Linseed ..	.33	1 15 0	8 4 0	3 8 0	Grown at Bardanga U. B. Farm.
		Tobacco ..	.67	9 0 0	135 0 0	55 0 0	Less area due to total failure at "Sresurara U. B. Farms.
		Cabbage ..	.90	5,500 Nos.	66 0 0	45 0 0	Less area due to the failure of raising seedlings; but much better area and yield than 1938-39.
		Cauliflower ..	1.00	7,500 "	75 0 0	45 0 0	
		Tomato ..	1.00	232 0 0	116 4 0	60 0 0	

N. B.—(1) There was no other crop grown in the Union Board Farm.
 (2) Two silo pits (one at Bardanga Union Board Farms. 4' x 6½' and at Sresurara Union Board Farms. 4' x 4') were made 20 and 25 maunds silage prepared respectively.

APPENDIX I—contd.

Name of districts.	Number of Union Board Farms.	Particulars of crops grown.	Area.	Outturn.	Total sale-proceeds.	Cost.	Remarks.
Birbhum ..	4	Paddy—Badkalamkati 65 Aman paddy .. Napier grass .. Joar .. Gram .. Wheat .. Lentil .. Linseed .. Tori .. Rai .. Potatoes .. Vegetable .. Cauliflower .. Cabbage .. Tomato .. Kholrabi ..	B. k. 44 0 44 0 1 16 2 0 7 0 4 0 4 0 4 0 1 14 1 0 2 12 4 6	Mds. srs. ch. 445 2 9 594 17 0 13 20 0 315 0 0 15 22 0 8 34 0 5 27 0 4 23 0 1 5 0 0 4 0 77 30 0 .. 2,504 Nos. 2,560 Nos. 68 mds. 1,195 Nos.	Rs. a. p. 890 2 0 1,188 13 0 3 6 0 78 12 0 62 3 0 35 6 0 22 11 0 22 14 0 7 1 0 0 11 0 155 8 0 .. 78 4 0 80 1 0 51 4 0 18 10 0	Rs. a. p. 352 0 0 352 0 0 18 0 0 10 0 0 24 8 0 20 0 0 14 0 0 16 0 0 7 12 0 4 8 0 78 0 0 .. 215 0 0	Practically failed.

	Turnip	..	..	885 Nos.	13 13 0	..
	Beans	..	..	11½ srs.	1 7 0	..
	Peas	..	..	12 srs.	1 8 0	..
Artificial Farm Yard Manure prepared						
	..	..	..	..	..	1,340 mds.
Silage prepared						
	..	..	..	..	..	246 mds.
Bankura						
2	Aus paddy	..	6 0	52 30 0	131 14 0	66 2 6
	Aman paddy	..	14 0	176 10 0	440 10 0	162 0 0
	Napier grass	..	2 0	120 0 0	30 0 0	11 10 9
	Joar	..	3 0	185 0 0	46 4 0	12 12 6
	Groundnut	..	2 0	19 0 0	95 0 0	34 0 6
	Gram	..	2 0	7 0 0	28 0 0	14 2 3
	Wheat	..	1 0	5 28 0	28 8 0	18 14 0
	Mustard	..	2 0	5 27 0	44 9 0	20 0 0
	Tobacco	..	1 10	3 0 0	45 0 0	33 9 3
	Lentil	..	2 0	5 23 0	22 5 0	15 9 3
	Potato	..	1 0	60 32 0	152 0 0	40 6 0
	English vegetables	..	1 0	..	137 10 0	53 15 0

APPENDIX I—contd.

Statement of particulars of Union Board Farms as regards crops raised, outturn obtained and cost, etc.

Name of districts.	Number of Union Board Farms.	Particulars of crops grown.	Area.	Outturn.	Total sale-proceeds.	Cost.	Remarks.
			B. k. ch.	Mds. str. ch.	Rs. a. p.	Rs. a. p.	
Midnapore ..	6	Charnak aus paddy ..	0 10 0	3 0 0	7 8 0	3 11 9	
		Badkalamkati (55) aman paddy.	21 0 0	189 0 8 471 18 8	395 10 6	140 14 6	
		Dadkhani aman paddy	46 0 0	239 20 8	926 0 0	368 10 9	
		Jhingasail aman paddy	22 0 0	13 20 0	529 6 0	237 7 6	
		Tilakkachari aman paddy	9 0 0	14 0 0	28 11 0	56 14 0	Damaged by flood.
		Gosaba No. 23 aman paddy.	4 0 0	..	88 0 0	65 0 0	*48 bighas and 10 cottahs as are automatic expansion from last year's seed.
			*10.2 10 0	96 25 8	1,975 3 6	872 10 6	
		Napier grass ..	4 0 0	590 0 0	71 0 0	53 0 0	
		Maize (Kalinpong) ..	2 3 0	370 0 0	39 8 0	26 0 0	
		Groundnut A. H. 18 ..	4 0 0	36 36 0	104 0 0	76 0 0	
		Gram, Sabour 4 ..	13 8 0	37 28 0	160 2 0	60 12 0	
		Musuri No. 5 ..	5 10 0	10 7 8	44 1 0	21 6 9	
		Tori No. 7 ..	1 0 0	2 20 0	8 0 0	5 0 0	

[illegible]

APPENDIX I—contd.

Name of districts.	Number of Union Board Farms.	Particulars of crops grown.	Area.	Outturn.	Total sale-proceeds.	Cost.	Remarks.
Howrah ..	3	Aus paddy ..	B. k. ch. 5 0 0	Mds. str. ch. 14 0 0	Rs. a. p. 35 0 0	Rs. a. p. 50 0 0	The kharif crops were damaged by the flood in July and August 1939.
		Aman paddy ..	22 0 0	64 20 0	161 4 0	200 0 0	
		Jute ..	3 0 0	15 30 0	252 0 0	60 0 0	
		Napier and Joar (fodder)	3 0 0	360 0 0	180 0 0	30 0 0	
		Grouhnut ..	2 0 0	1 30 0	8 12 0	7 0 0	
		Rahar ..	1 0 0	2 35 0	14 6 0	7 0 0	
		Potato ..	1 4 0	94 0 0	188 0 0	72 0 0	
		Gram ..	3 0 0	1 32 0	7 3 0	21 0 0	
		Lentil ..	3 0 0	5 25 0	22 8 0	21 0 0	
		Linseed ..	1 10 0	1 30 0	7 0 0	10 8 0	
		Tori ..	1 10 0	0 25 0	3 12 0	10 8 0	
		Rai ..	1 10 0	2 5 0	12 12 0	10 8 0	
		Tobacco ..	1 10 0	4 35 0	73 2 0	30 0 0	
		English vegetables ..	1 10 0	..	169 8 0	75 0 0	
		Total ..	49 14 0	..	1,135 3 0	624 8 0	

APPENDIX I—concl'd.

Statement showing the results obtained in Union Board Farms in the district of Murshidabad for the year 1939-40.

Serial No.	Name of crops.	Total area sown under each crop.	Actual area harvested.	Outturn received.	Value of outturn.	Value of seeds, manures, implements adjusted by S. T.	Cash price of seeds, manures and implements incurred by Government.	Total expenditure of Government for each item.
		B. k.	B. k.	Mds.srs.	Rs. a.	Rs. a. p.	Rs. a.	Rs. a. p.
1	Aus paddy ..	18 0	18 0	95 0	237 8	12 8 0	..	12 8 0*
2	Aman paddy ..	18 0	..	..	..	7 9 6	..	7 9 6
3	Maize for fodder	2 0	2 0	152 10	38 1	3 0 0	..	3 0 0
4	Jute ..	4 0	1 0	4 20	67 8	..	6 1	6 1 0
5	Groundnut ..	4 0	3 0	10 0	60 0	9 10 0	..	9 10 0
6	Napier grass ..	2 0	2 0	330 0	82 8	..	..	1 0 0
7	Linseed ..	4 0	4 0	6 15	31 14	2 0 0	..	2 0 0
8	Gram ..	8 0	8 0	27 10	68 2	6 0 0	..	6 0 0
9	Itai No. 5 ..	4 0	4 0	4 28	23 8	1 3 3	..	1 3 3
10	Lentil ..	4 0	4 0	10 35	27 3	2 6 6	..	2 6 6
11	Tobacco ..	2 0	2 0	5 12	84 12	0 4 0	..	0 4 0
12	Potato ..	4 0	1 8	65 0	97 8	..	45 0	45 0 0
13	English vegetables	2 0	2 0	Rs. 620	620 0	..	8 0	8 0 0
14	Manures ..	..	..	Nicifos, castor-cake and bone-meal were supplied.			267 12	267 12 0
15	Paddy Gola ..	1 number.	..	..	..	..	50 0	50 0 0
16	Shed over Manure.	Plt—1 number.	..	..	..	..	10 0	10 0 0
		..	..	..	..	49 9 3	366 13	432 6 3

* Crop totally damaged by heavy flood.

APPENDIX II.

Consolidated statement showing the Agricultural Operation undertaken during the year 1939-40.

Name of districts.	Number of demonstration centres.	Particulars of crops grown.	Area.	Outturn.	Total sale-proceeds.	Cost.	Remarks.
			B. k.	Mds. srs.	Rs. a. p.	Rs. a. p.	
24-Parganas ..	11	Dharial aus ..	99 0	778 0	2,334 0 0	990 0 0	
		Jute ..	11 0	77 10	1,004 4 0	220 0 0	
		Groundnut ..	11 0	60 20	302 8 0	99 0 0	
		Napier grass ..	11 0	1,375 0	331 4 0	110 0 0	
		Patnai aman ..	168 0	1,323 25	3,970 14 0	1,680 0 0	
		Chinsurah No. 11 ..	63 0	441 0	1,323 0 0	630 0 0	
		Tobacco ..	11 0	27 30	222 0 0	99 0 0	
		Wheat ..	11 0	39 1	234 2 6	66 0 0	
		Gram ..	11 0	42 15	211 14 0	55 0 0	
		Lentil ..	11 0	37 5	148 8 0	55 0 0	
		Jowar ..	11 0	1,100 0	275 0 0	55 0 0	
		Cowpea ..	11 0	550 0	137 8 0	44 0 0	
		Dhaincha ..	110 0		Green manured.		
		Potato ..	5 0	314 15	864 8 6	165 0 0	

Nadia	..	12	144 0	803 19	2,008 11 0	864 0 0	
Dharia! aus paddy	144 0	803 19	2,008 11 0	864 0 0	
Badkalamkati	12 0	296 17	741 1 0	986 0 0	
Jhingaseil	144 0	487 37	1,219 13 0	936 0 0	Jhingaseil aman paddy partially damaged.
Rahor	36 0	63 10	189 12 0	110 12 0	
Groundnut	6 0	19 30	98 12 0	114 0 0	
Jowar	30 0	2,595 0	649 0 0	112 8 0	
Napier grass	4 0	500 0	125 0 0	20 0 0	
Gram (S. 4)	12 0	43 22	108 14 0	36 0 0	
Lentil No. 5	12 0	22 33	68 7 6	36 0 0	
Tori No. 7	24 0	33 25	168 2 0	64 8 0	
Rai No. 5	6 0	4 24	23 0 0	16 2 0	
Linseed	3 0	7 19	18 11 0	15 0 0	
Wheat	6 0	20 15	50 15 0	39 0 0	
Tobacco—Matihari	6 0	14 34	178 3 0	39 0 0	
Tobacco—Bhengi	6 0	14 8	71 0 0	39 0 0	
Potato	6 0	143 6	246 5 0	120 0 0	
English vegetables	6 0	Dhinchha	240 13 10	180 0 0	
Dhaincha	12 0	Green manure.	..	3 0 0	

APPENDIX II—*contd.*

Name of districts.	Number of demonstration centres.	Particulars of crops grown.	Area.	Outturn.	Total sale-proceeds.	Cost.	Remarks.
			B. k.	Mds. srs.	Rs. a. p.	Rs. a. p.	
Bankura	7	Aus paddy ..	38 10	290 33	727 1 0	304 4 0	
		Aman paddy ..	175 0	1,977 17	4,942 8 0	2,128 0 9	
		Napier grass ..	7 0	207 0	51 12 0	35 8 0	
		Joar ..	14 0	560 0	140 0 0	68 7 6	
		Groundnut ..	7 0	44 4	221 14 0	76 4 0	
		Gram ..	7 0	20 25	82 8 0	42 13 3	
		Wheat ..	3 0	14 5	70 10 0	37 8 6	
		Lentil ..	7 0	17 16	69 9 0	43 9 3	
		Mustard ..	7 0	13 26	109 8 0	40 6 6	
		Tobacco ..	27 0	73 35	1,108 2 0	546 9 3	
		English vegetables	3 10	..	563 2 0	203 12 6	
Birbhum	12	Gram ..	25 0	55 27	222 11 0	87 8 0	
		Wheat ..	13 2	25 10	101 0 0	65 8 0	
		Lentil ..	12 5	19 35	79 0 0	42 14 0	

Linseed	..	15 0	14 31	73 14 0	60 0 0
Tori	..	6 4	1 19	9 3 0	27 14 0
Rai	..	6 9	1 27	10 7 0	29 1 0
Potatoes	..	6 9	205 11	410 9 0	193 8 0
Vegetable	..	10 18	..	..	..
Cauliflower	..	..	4,908 Nos.	153 6 0	545 0 0
Cabbage	..	..	6,242 "	195 1 0	
Tomato	..	..	173 mds.	129 15 0	
Turnip	..	..	1,975 Nos.	29 5 0	
Kholrabi	..	..	2,766 "	43 3 0	
French bean	..	..	1 mdl. 3 srs.	5 6 0	..
Peas	..	..	32½ srs.	4 1 0	
Quantity of artificial farm yard manure prepared.	..	..	5,112 mds.	..	..
Quantity of silage prepared	..	..	583 "	..	..
Backalamkati 65	..	..	..	..	..
Aman paddy	..	95 5	950 14	1,900 11 0	761 9 0
Aman paddy	..	276 14	2,236 20	4,473 0 0	2,213 4 0
Napier grass	..	6 18	392 0	98 0 0	69 0 0
Joar	..	17 2	948 20	237 2 0	85 8 0

APPENDIX II—contd.

Statement showing the results obtained in the Demonstration Centres for the year 1939-40.

Name of districts.	Number of demonstration centres.	Particulars of crops grown.	Total area shown under each crop.	Actual area harvested.	Outturn received.	Value of outturn.	Value of seeds, manures, implements adjusted by N. I.	Cash price of seeds, manures, implements incurred by Government.	Total expenditure of Government for each item.	Remarks.	
Murshidabad	12	Aus paddy	B. k. 150 0	B. k. 179 10	Mds. str. ch. 21 15 0	Rs. a. p. 2,054 6 0	Rs. a. p. 123 12 0	Rs. a. p. ..	Rs. a. p. 123 12 0	Crop damaged by flood.	
		Amam paddy	..	33 0	347 0 0	867 5 0	65 5 3	..	65 5 3		
		Groundnut	..	12 0	8 7	28 20 0	171 0 0	21 0 0	..	21 0 0	Fodder.
		Joar for fodder	..	36 0	19 0	1,924 0 0	481 0 0	..	21 13	21 13 0	
		Napier grass	..	12 0	12 0	2,250 0 0	562 0 0	6 0 0	..	6 0 0	
		Gram	..	12 0	12 0	38 26 0	96 10 0	9 0 0	..	9 0 0	
		Linseed	..	12 0	12 0	1- 29 0	93 10 0	6 0 0	..	6 0 0	
		Wheat	..	12 0	12 0	33 21 0	134 1 6	10 12 9	..	10 12 9	
		Bal No. 5	..	12 0	12 0	11 27 8	58 7 0	3 9 6	..	3 9 6	
		Lentil	..	12 0	12 0	30 6 0	75 6 0	7 3 3	..	7 3 3	
		Tobacco	..	12 0	12 0	29 1 0	464 6 0	1 5 0	..	1 8 0	
		Potato	..	6 0	5 10	243 28 0	365 9 0	..	100 0	100 0 0	
		English vegetables	..	36 0	25 10	Rs. 910.	910 0 0	..	57 13	57 13 0	
		Preparation of artificial farm yard manure.	..	..	24 Nos.	..	..	16 0	16 0 0	16 0 0
		Slilage making	..	..	4 "	..	..	42 0	42 0 0	42 0 0
		Manure—Nicifos. Castor-cake.	..	..	16 Nos.—Handhoes. 4 Wrenches.	..	..	193 8	193 8 0	193 8 0
		Total	..	..	..	..	..	177 4	177 4 0	177 4 0
						254 2 9	608 6	862 8 9			

Name of districts.	Number of demon- station centres.	Particulars of crops grown.	Total area-s.	Outturn.	Total sale-proceed.	Cost of cultivation.	Remarks.
			B. k.	Mds. srs. ch.	Rs. a. p.	Rs. a. p.	
Jessore	14	Aus paddy	67 0	522 29 0	974 5 0	630 0 0	17 bighas damaged.
		Aman paddy	155 0	946 20 0	2,355 2 0	2,928 0 0	181 bighas damaged.
		Maize	1 10	157 0 0	50 10 6	35 0 0	5½ bighas damaged.
		Napier grass	2 0	5 33 0	1 7 6	75 0 0	5 bighas damaged.
		Joar	1 0	25 5 0	1 9 6	30 0 0	2½ bighas damaged.
		Gram	56 0	167 15 0	669 8 0	280 0 0	
		Lentil	70 0	171 32 0	687 3 3	350 0 0	
		Wheat	14 0	30 10 0	151 4 0	116 0 0	
		Potato	7 0	267 39 0	670 8 0	410 0 0	
		Tobacco	70 0	34 20 8	517 11 0	1,550 0 0	
		Groundnut	5 10	10 2 0	50 4 0	56 0 0	1½ bighas damaged.
		Cauliflower		In number— 3,393			
		Cabbage		3,348			
		Knol khol		3,459			
		Turnip	65 0	2,268	606 0 6	1,320 0 0	5 bighas damaged.
		Pea		12-seers.			
		Tomato		38mds. 26srs.			

APPENDIX II—*contd.*

Name of districts.	Number of demon- stration centres.	Particulars of crops grown.	Total areas.	Outturn.	Total sale- proceed.	Cost of cultivation.	Remarks.
Khulna	7		B. k.	Mds. srs. ch.	Rs. a. p.	Rs. a. p.	
		Aus paddy ..	42 0	320 20 0	807 14 0	374 0 0	
		Aman paddy ..	119 0	934 0 0	2,164 0 0	963 0 0	Less area is due to seed being damaged by excessive rains.
		Maize ..	3 10	760 0 0	190 0 0	52 0 0	
		Napier grass ..	3 10	645 0 0	161 4 0	70 0 0	
		Gram ..	14 0	51 0 0	204 0 0	66 0 0	
		Lentil ..	7 0	24 30 0	107 0 0	30 0 0	
		Linseed ..	..	..	..	..
		Tobacco ..	3 10	..	..	39 0 0	Not yet cure.
		English vegetables ..	3 10	..	287 0 0	134 0 0	
		Potato ..	..	..	..	..
		Mustard ..	7 0	25 20 0	153 0 0	38 0 0	
Howrah	7	Aus paddy ..	7 0	4 20 0	11 4 0	70 0 0	The kharif crops were damaged by the flood in July and August, 1939.
		Aman paddy ..	203 0	356 30 0	891 14 0	2,030 0 0	

Napier and Joar (fodder)		21 0	788 0 0	394 0 0	210 0 0
Groundnut	..	3 10	1 10 0	6 4 0	24 8 0
Potato	..	2 9	187 0 0	374 0 0	147 0 0
Gram	..	7 0	3 36 0	15 10 0	49 0 0
Lentil	..	3 10	11 15 0	45 8 0	24 8 0
Tori	..	3 10	2 12 0	13 14 0	21 0 0
Rai	..	3 10	5 33 0	34 14 0	221 0 0
Tobacco	..	7 0	19 15 0	290 10 0	140 0 0
English vegetables	..	3 10	..	281 6 0	175 0 0
Total	..	264 19		2,359 4 0	2,912 0 0

APPENDIX II—contd.

Statement of the particular of Demonstration Centres as regards crops raised, outturn obtained and cost, etc., for 1939-40.

Name of districts.	Number of demon- stration centres.	Particulars of crops grown.	Area in acres.	Outturn.	Total sale- proceeds.	Cost of cultivation.	Remarks.
Burdwan ..	12	Charnock aus paddy .. Badkalamkati aman paddy. Jhingasail aman paddy Chinsurah No. 2 aman paddy. Patnai 23 aman paddy Dudsar aman paddy .. Joar .. Rahar .. Groundnut .. Potato—Darjeeling .. Wheat P 52 ..	9.26 25.49 52.82 19.33 41.60 3.00 1.16 6.66 33 4.25 2.66	Mds. srs. ch. 280 0 0 806 29 0 1,652 6 0 546 34 0 1,318 26 0 96 0 0 370 0 0 43 11 0 9 13 0 619 24 0 28 4 0	Rs. as. p. 700 0 0 2,020 13 0 4,130 6 0 1,327 2 0 3,956 5 0 250 0 0 Fed as fodder 116 6 0 74 10 0 1,549 0 0 169 0 0	Rs. as. p. 227 8 0 765 0 0 1,535 0 0 580 0 0 1,280 0 0 90 0 0 4 8 0 40 0 0 10 0 0 510 0 0 56 0 0	Grown at Katwa Centre only. Flourishing well at Katwa Centre. Grown at Asansol Centre only. Ditto. Grown after early aman.

Gram—Sabour	..	3.33	39 0 0	156 0 0	50 0 0	Ditto.
Linseed ..	..	1.00	3 15 0	20 4 0	3 8 0	Grown only in Asansol Centre.
Tobacco—Motihari	..	.66	9 15 0	84 3 0	50 0 0	Failure at Hatgobindapur, Katwa and Asansol.
Cabbage ..	..	1.00	6,000 heads	79 0 0	45 0 0	Failure at seedlings in the seed-bed at Hatgobindapur.
Cauliflower	..	1.00	6,911 heads	69 12 0	45 0 0	Ditto.
Tomatoes ..	..	.88	198 0 0	99 0 0	52 0 0	Ditto.
Napier grass	..	.16	200 0 0	Fed as fodder	2 8 0	Grown only in Katwa Centre.

N. B.—No other crops grown in the demonstration centres.

Maunds.

Artificial Manure 9 heaps—

Galsi 3 heaps	..	..	..	..	15
Asansol 3 heaps	..	..	..	..	18
Katwa 2 heaps	..	..	..	..	12
Hatgobindapur 1 heap	..	..	..	..	9

APPENDIX II—*contd.*

Name of district.	Number of demonstration centres.	Particulars of crop grown.	Area.	Outturn.	Total sale-proceed.	Cost of cultivation.	Remarks.
Midnapore ..	13		B. k.	Md. sr. ch.	Rs. a. p.	Rs. a. p.	
		Charnock aus paddy ..	1 0	13 20 0	17 4 9	7 7 6	
		Dhalasaite aus paddy ..	13 0	133 10 0	267 0 0	97 1 6	
		Marichbuti aus paddy ..	0 10	5 0 0	11 9 0	5 11 6	
		P. x S. aus paddy ..	0 10	4 0 0	9 0 0	4 11 6	
		Bedkalamkati (65) aman paddy ..	394 11	2,882 11 14	6,138 11 9	2,699 4 3	
		Dedkhami aman paddy	16 15	170 9 12	402 10 0	101 7 6	
		Jhingasail aman paddy	154 19	1,685 39 8	4,037 5 9	1,023 11 3	
		Gosaba No. 23 aman paddy ..	24 0	306 0 0	647 12 0	210 12 0	
			*605 5	5,200 11 0	11,531 5 3	5,150 3 0	*215 bighas and 5 cottahs are automatic expansion from last year's seed.
		Maize (Kalimpong) ..	0 15 0	Fodder. 192 0 0	13 10 0	8 0 0	
		Groundnut A. H. 18 ..	3 12 0	23 6 0	115 12 0	56 8 6	

Gram, Sabour 4	..	48 4 0	146 5 8	589 6 9	243 4 0
Musuri No. 5	..	20 2 0	54 17 0	253 2 0	111 9 6
Tori No. 7 ..	..	1 0 0	3 0 0	18 0 0	6 0 0
Tobacco (Matihari and Bhengi) ..	..	11 13 0	40 30 6	846 7 9	512 6 0
Potato (Darjeeling)	..	10 13 8	562 31 0	1,150 12 0	724 4 3
Wheat (Pusa 52)	..	7 9 8	31 17 0	162 9 3	72 7 6
English vegetables	..	14 6 0	..	765 10 6	414 4 6
			Gur.		
Sugarcane Co. 213	..	5 14 8	189 15 0	1,013 0 0	517 15 0
		123 9 8			

APPENDIX II—concl'd.

Consolidated statement showing the area harvested yield and sale-proceeds from different crops grown on the Demonstration Centres in Hooghly district, 1939-40.

Name of district.	No. of demonstration centre.	Particulars of crops grown.	Area.	Outturn.	Total sale-proceeds (Estimate).	Cost of cultivation.	Remarks.
			B. k.	Mds. srs.	Rs. a.	Rs. a.	
Hooghly	11	Jute	10 0	53 5	425 0	250 0	
		Aus paddy ..	43 5	217 19	435 0	519 0	
		Groundnut ..	6 4	32 22	162 12	93 8	
		Maize	2 10	205 20	51 6	17 8	
		Juar	3 8	264 0	66 0	24 8	
		Aman paddy ..	233 10	2,011 32	5,020 8	1,808 0	
		Napier grass ..	1 8	44 0	11 0	17 0	
		Mustard	8 10	10 3	65 7	42 8	
		Gram	32 18	54 34	202 8	165 0	
		Lentil	32 12	46 4	172 8	165 0	
		Peas	32 9	{ 13 16 20 32 76 0	{ 48 12 77 13 19 0	{ 195 0	Grain. Pods. Green fodder.
		Tobacco	13 11	27 6	407 4	270 0	
		Wheat	15 10	31 12	125 3	124 0	
		English vegetable ..	5 3	..	250 2	180 0	
		Potato	7 5	197 5	374 4	290 0	

Total cost incurred by the Department, Rs. 437-15-9.

APPENDIX III.

Exhibitions and Lantern Lectures.

Name of district.	Name of the place of the shows.	Number of lantern lectures.	Number of cultivators attending the lectures.	Remarks.
Bankura ..	....	..	..
Birbhum ..	Srinketan, Suri, Raipur ..	Nil	Nil	Only lectures on the exhibition grounds were given.
Howrah ..	Howrah Welfare Unit Exhibition at— 1. Jagatballavpur. 2. Kalltala Bazar. 3. Jagatballavpur Harisava Mela. 4. Uluberia. 5. Srirampur.	Seven	7,000	
Khulna ..	1. Daulatpur .. 2. Patkelghati .. 3. Palkgacha .. 4. Chandkhali .. 5. Kalaroa .. 6. Barrackpur .. 7. Terokhada ..	2 2 1 1 2 6 1	400 200 100 50 200 500 250	
Burdwan ..	1. Memari .. 2. Usagram. 3. Asansol. 4. Panuria.	Nil	Nil	
Hooghly ..	1. Mosra .. 2. Jangipara .. 3. Arambagh ..	Nil	200-300 700-800 700-800	Except at Mosra lectures and other demonstrations were given at Jangipara and Arambagh.
Nadia ..	1. Raipur .. 2. Amjhupi .. 3. Barkhoda .. 4. Burtoli .. 5. Bullavpur .. 6. Chapra .. 7. Chuadanga .. 8. Meherpur ..	1 1 1 1 1 1 1 1	350 400 300 150 300 1,000 250 200	Lectures in accompaniment with the gramophone records only.
24-Parganas ..	1. Diamond-Harbour .. 2. Kowgachi .. 3. Itinda .. 4. Tollyganj ..	.. .. .. ..	3,500 800 1,000 4,500	7 lectures were given without magic lantern. 8 lectures were given without magic lantern. 1 lecture was given without magic lantern. 15 lectures were given without magic lantern.
Berhampore ..	1. Lalgola .. 2. Nimtita ..	.. ..	500 350	

APPENDIX IV.

Distribution of Seeds and Cuttings during 1939-40.

Name of seeds and cuttings.	Quantity sold.			Quantity supplied free.		
	Mds.	sr.	ch.	Md.	sr.	ch.
1. Paddy—aus (of different strains)	484	3	8	208	10	0
2. Paddy—aman (of different strains)	1,203	17	4	554	1	0
3. Napier cuttings	499	0	0	281	0	0
4. Cowpea	2	22	8	7	33	0
5. Joar	0	16	0	35	19	8
6. Maize	1	1	4	16	35	0
7. Jute seeds	7	11	0	1	27	8
8. Groundnut	25	1	8	20	1	0
9. Gram	15	30	12	57	30	0
10. Lentil	35	14	9	26	20	0
11. Rahar	4	11	12	0	13	12
12. Dhaincha .. ..	..	..	..	30	0	0
13. Castor	0	5	0	..	..	..
14. Potato .. ..	..	..	..	126	20	0
15. Linseed	1	24	5	4	32	0
16. Mustard	11	1	12	9	32	0
17. Peas	0	13	0	11	20	0
18. Tobacco seeds—Motihari	443	tolas.	..	242	tolas.	..
19. Wheat	14	20	12	19	16	0
20. Vegetable seeds	18	tolas.	..	412	tolas.	..
21. Sugarcane cuttings	395	25	0	232	0	0
22. Lime grafts	26	0	0	..	..	..
23. Cotton	0	30	0	0	25	0
24. Bean Madagascar	0	11	4½	..	..	..
25. Banana suckers	2	0	0	..	..	..

APPENDIX V.

Farm-yard Manure and Silage produced in the Government Farms.

Name of Government Farm.		Quantity manu- factured farmyard manure.	Silage.	
		Mds.	Md.	sr.
Bankura .. ..	..	800	154	0
Suri .. ..	..	780	250	7
Burdwan .. ..	..	581	281	0
Krishnagar .. ..	..	705	1,364	0
Chinsurah .. ..	..	1,193	Nil.	..
Berhampore .. ..	..	2,900	Nil.	..

Of green fodder put into the pit.

APPENDIX VI.

Activities of Court of Wards, Khas Mahal, District Board and Agricultural Association in connection with the Improvement of Agriculture.

Name of district.	Name of agencies.	Distribution of seeds in quantity.	Numbers of Agricultural Demonstrators appointed and maintained.	Contribution and grant.
				Rs.
Bankura ..	Raha Wards' Estate	Patnai paddy .. 5 maunds. Bhasamanlek .. 5 maunds. Jhingasall .. 10 maunds. Charnack aus .. 5 maunds. Bhutmuri 36 .. 5 maunds. Darjeeling potato .. 27½ maunds. Rahar .. 1½ maunds. Tobacco seeds .. 15 tolas. Groundnut .. 2 maunds. Mustard .. 11 seers. Winter vegetable .. 2½ lbs. Napier grass .. 4 maunds.	One ..	2,000
	Khas Mahal ..	20 maunds of paddy seed ..	Nil	50
	District Board ..	Nil	Nil	100
	District Agricultural Association.	130 maunds of seed potatoes ..	Nil	District Board grant of 100
Birbhum ..	District Agricultural and Rural Reconstruction Association.	Paddy .. 84 maunds Joar .. 17 seers. English vegetable seeds .. 2 lbs. 10½ oz.	Nil	..
Howrah ..	District Board ..	Nil	....	300
	District Agricultural Association.	Cocconut seed from South India. 300 Nos. Pineapple suckers 120 Nos. Banana suckers .. 60 Nos. Montai radish seeds .. 3 seers. Darjeeling red round potatoes .. 7 maunds. Tomato seed .. 2 lbs.	....	Nil
Nadia ..	Nil	Nil	Nil	Nil
Burdwan ..	Nil	Nil	Nil	Nil
Midnapore ..	Basudebpur ..	Bhutmuri Aus paddy No. 9 .. 1 maund.		
	Ballishahi ..	Badkalamkati aman paddy No. 7 .. 4 maunds.		
	Naren Pahari Wards' Estates.	Badkalamkati aman paddy No. 65 .. 40 maunds. Bolder aman paddy .. 3 maunds. Gosaba No. 23 aman paddy .. 6 maunds. Groundnut A. H. 18 .. 7 maunds 12 seers. Sunn hemp (Fibre Export, Bengal) .. 22 seers. Matthari tobacco seed 18 tolas. Sugarcane cuttings C.O. 213 .. 10,000 cuttings. Napier grass cuttings 11 maunds. Dacca No. 1 cotton 1 seer. Maize (Kallimpong) 4 seers. Juar .. 4 seers. Wheat Pusa 52 .. 4 seers. Potato Great scott 24 maunds 20 seers. Dhaincha seed .. 11 maunds. Papaya Ranchi .. 3 packets. Tarmuj Goulundo .. 6 packets. English and country vegetables. Worth Rs. 136.	3 Agricultural Demonstrators 1 for each estate was maintained by the estates.	3,740

APPENDIX VII.

Production in the Government Farms of Napier grass cutting and their distribution.

Name of Government Farm.	Quantity grown.	Free.	Quantity distributed on payment.
	Mds. srs.	Mds. srs.	Mds. srs.
Bankura	406 0	36 0	17 0
Birbhum	210 35 (green fodder) 0 (cuttings).	Nil	Nil
Burdwan	600 0	Nil	49 0
Krishnagar	87 0	26 0	61 0
Berhampore	630 0	28 0	54 0
Chinsurah	1,105 32	....	349 17

**Annual Report of the Deputy Director of Agriculture, Northern Circle,
for the year 1939-40.**

1. **Charge.**—I held charge of the Circle throughout the year and was assisted by Mr. A. M. Ahmad, Superintendent of Agriculture, Rajshahi Division, who joined this Circle on 31st July 1939. I was on tour for 126 days and Mr. A. M. Ahmad toured for 119 days during the year.

2. **Staff.**—The strength of the district staff remained the same, excepting that an Officer of the Class I, Subordinate Agricultural Service, was placed in charge of the Bogra district with effect from 9th March 1940, where an Officer of the Class II, Subordinate Agricultural Service, was holding charge.

Below is given the list of officers who held charge of the districts and also of the Government Agricultural Farms, where there is one, with number of days spent by each on tour:—

District.	Officer-in-charge.	Period.	Number of days on tour.
Rajshahi ..	Babu P. K. Das ..	Throughout the year ..	124
Naogaon and Natore.	Babu Benode Ch. Ghosh ..	Up to 15th June 1939 when he retired from service.	32
	Babu Nritya Gopal Mazumder	From 16th June 1939 to 31st March 1940.	154
Rangpur ..	Babu D. N. Banerji ..	Throughout the year ..	138
Dinaipur ..	Babu Kamini K. Lahiri ..	From 1st April to the 31st August 1939 and from the 23rd March to the 31st March 1940 (from 1st September 1939 to 22nd March 1940 he was on leave).	66
	Babu Nirmal K. Roy ..	From 1st September to 16th October 1939.	9
	Babu Bhupendra Ch. Sen ..	From the 17th October 1939 to 22nd March 1940.	74
Pabna ..	Babu Nritya Gopal Mazumder	From 1st April to 9th June 1939.	39
	Babu Nirmal K. Roy ..	From 10th June to 24th June 1939.	6
	Maulvi Abdul Jalil ..	From 25th June 1939 to 31st March 1940.	114
Bogra ..	Babu Jatindra Mohan Ganguly	From 1st April 1939 to 8th March 1940.	162
	Babu Hiran K. Basak ..	From 9th March to 31st March 1940.	2
Jalpaiguri ..	Babu Abani Mohan Das ..	Throughout the year ..	171
Malda ..	Babu Sauti Ranjan Mukherji	Ditto ..	75

Agricultural Officers in charge of Sugarcane Growers' Co-operative Societies.

District.	Officer-in-charge.	Period.	Number of days on tour.
Rajshahi ..	Babu Nirmal Deb ..	Throughout the year ..	156
Setabganj (Dinajpur).	Babu Atul Ch. Bose ..	Ditto ..	231

There were two Overseers—one being posted at the Rangpur Demonstration Farm and the other at the Rajshahi Farm. The strength of the permanent Agricultural Demonstrators was increased by 3 and 1 of the posts of the temporary Agricultural Demonstrators was made permanent, so there were 41 permanent and 2 temporary Agricultural Demonstrators at the end of the year.

The staff under the Indian Central Jute Committee was increased during the year but those under District Agricultural Officers in charge of the Sugarcane Growers' Co-operative Societies, remained the same.

The staff were distributed as follows :—

District.	Departmental Agricultural Demonstrators.		Temporary Agricultural Demonstrators. Sugarcane Growers' Societies.	Temporary staff under Jute Committee Scheme.	
	Permanent.	Temporary.		Overseer.	Agricultural Demonstrators.
Rajshahi ..	3	1	3	..	1
Naogaon-Natore	3	1	..	1	1
Dinajpur ..	6	..	3 (Setabganj)	..	1
Malda ..	6	..	..	..	1
Bogra ..	5	..	..	1	2
Pabna ..	5	..	..	..	2
Jalpaiguri ..	6	..	..	1	4
Rangpur ..	7	..	..	1	4
	41	2	6	4	16

3. **Season.**—The rainfall was not evenly distributed. In the beginning there was drought in April and first part of May. With the advent of the monsoon, there was heavy and continuous rain during months of June to October. This was followed by prolonged drought from November to January. The season ended with unusual heavy rain in March. The weather was on the whole unfavourable both for kharif and rabi crops in Rangpur, Dinajpur, Jalpaiguri and Rajshahi and specially for rabi crops in Pabna, Bogra and Malda district. Excepting in Malda, jute was more or less damaged in all

districts. In Rajshahi jute crop on some areas was completely destroyed by drought at the sowing time and subsequent heavy rains. The outturn of aus and fodder crops was also affected in Rajshahi, Rangpur, Dinajpur, Jalpaiguri and Bogra. In Pabna about 2 annas of low land aus were damaged by flood. Some damage was done to winter paddy by rain and flood in some parts of the Rajshahi district, and by shortage of water followed by flood in Pabna district. Unusual heavy rain in October damaged the vegetable and tobacco seedlings and the early sown potatoes in many places. On this account lands, which remained in wet condition till late in the season, could not be prepared in time and rabi sowing was delayed in most places. The outturn of rabi crops generally was, therefore, unsatisfactory. Again due to unusual heavy rains in March the standing crops were damaged to some extent and the quality deteriorated.

4. **District Farms.**—There is one Government Farm in each of the seven districts in this Circle excepting Bogra where there are two farms—one in the Khear area and another on the other side of the river in the Pali area. Detailed information on the work carried out in each farm may be seen in the report of the respective farms published separately.

A short note on the work of each farm is given below :—

Rajshahi Farm.—Out of the total area of 63 acres, 48.15 acres were available for cultivation.

The season was unfavourable for all crops.

There was drought till the middle of May and heavy and continuous rain from middle of June to the end of October. Again, there was long continuous drought from November to January and cloudy weather and unusual heavy rainfall in March.

Due to unfavourable weather conditions all kharif and rabi crops suffered much. The experimental jute, Agartala kalai, mustard and cowpea practically failed. The outturn of other rabi crops was affected and the quality deteriorated. The crops of the farm also suffered from attack of insect pests.

Experimental cultivation.—(1) Economic Botanist's varietal test with aus, aman paddies and wheat and pure-line experiment with wheat. (2) Agricultural Chemist's varietal test with sugarcane. (3) Deputy Director of Agriculture's (Eastern Circle) test with Burma beans.

Seed multiplication.—Second Economic Botanist's cotton, rahar, tori and cowpea.

Non-experimental cultivation.—Aus and aman paddies, joar, oats and peas, khesari for fodder, Napier grass, Agartala Kalai, lentils, peas, wheat, tobacco, gram, vegetables and fruits (mangoes and plantains) were grown.

Dudsar paddy, Napier grass, sugarcane wheat, maize and joar fodder were grown on 8.44 acres of land on economic basis.

There were 13 pairs of bullock and a stud bull on the farm. One pair of old bullock was rejected and auctioned. A new pair to replace another old pair has been purchased at the end of the year. Up till 29th February 1940, 45 cows were presented to the bull, of which 39 were covered successfully; the animal was made over to the Live-Stock

Officer, Rajshahi, on the 1st March 1940. 2,575 cubic feet of artificial farm yard manure was prepared and 1,113 maunds 20 seers of joar was made into silage during the year.

The old silted up tank in the B block was re-excavated.

Rangpur Demonstration Farm.—Out of the total area of 19·70 acres, 15·71 acres were available for cultivation, the rest being under buildings, roads, tanks, etc. The season was on the whole not favourable for crops—both kharif and rabi. For want of rainfall in April and in the first half of May, the sowing of kharif crops was delayed. Jute in the highland dried up and maize suffered badly. Excessive rainfall in May and June again stood in the way of timely cultural operations.

The aman paddy on the other hand badly suffered on account of shortage of rainfall in July and August. Heavy rainfall in October hindered preparation of land for rabi sowing and totally damaged vegetable seedlings in the seed-bed. After November there was no rainfall which is essential for rabi crops.

Experimental cultivation.—(a) Economic Botanist's varietal test with aus and aman paddy, (b) Assistant Fibre Expert's experiment with jute and flax, (c) Second Economic Botanist's experiment with cotton, rahar and cowpea, (d) Agricultural Chemist's experiment with sugarcane and berseem (fodder) were carried out.

Non-experimental cultivation.—Aus and aman paddy, joar, maize, oats and peas and kheshary for fodder, Napier grass, mustard, lentil and gram were grown.

Bhashamanik aman paddy was grown profitably on an area of 1·60 acres on economic basis—outturn received was 43 maunds 20 seers.

There are 8 bullocks and 1 stud bull on the farm. Two pairs of bullocks were purchased in March to replace 2 pairs which have grown old. The bull served 141 cows during the year. The general condition of the bull was satisfactory.

3,833 cubic feet of artificial farm yard manure and 200 cubic feet of water-hyacinth compost were made in the farm.

Six culverts were constructed in the farm for proper drainage of rain water.

Pabna Farm.—The area of the farm is 18·90 acres of which 4·04 acres are occupied by buildings, roads, tanks, etc., and the rest 14·86 acres could be had for cultivation. Of this area 11·95 acres were cropped twice during the year.

The season was on the whole favourable for kharif crops. Incessant rain during July, August and September was harmful for harvesting, threshing, and drying of aus paddy. Long continued drought affected the rabi crops. The March rain again damaged rabi crops to some extent, though, it was of help for the sowing of jute and aus paddy in lowlands.

Experimental cultivation.—(a) Economic Botanist's varietal test with aus paddy and wheat test and pure-line experiments and (b) Agricultural Chemist's varietal test with sugarcane and berseem experiments were carried out. Berseem was a new fodder crop in this farm and was grown successfully.

Non-experimental cultivation.—Aus and aman paddy, wheat, potato, gram, lentil, Agartala Kalai, Napier grass and joar for fodder

were grown. Aus, joar, English vegetables and tobacco were grown on economic basis.

As a result of dislocation of a hock joint, one bullock had to be sold off by public auction, another old bullock was also sold and a new pair purchased at the end of the year, otherwise the condition of the animals was good.

1,838 maunds of artificial farm yard manure were prepared during the year.

Malda Farm.—Total area of the farm is 18·645 acres, 4·035 acres being occupied by buildings, roads and tanks, etc., 14·61 acres were available for cultivation.

The season was favourable for kharif crops but unfavourable for rabi crops. Due to long continued drought, the rabi crops could not thrive well and again, untimely heavy showers in March badly affected the crops.

Experimental cultivation.—Aus and aman experiments of the Economic Botanist were successfully conducted during the year. The Economic Botanist's experiments were also conducted with wheat.

Non-experimental cultivation.—Aus and aman paddy, Altisima for seed, joar, maize and khesari for fodder, gram, lentil, potato, tobacco, wheat, tori, English vegetables were grown. Tori was damaged by insects. Katakara aus and lentils were grown on economic basis.

One pair of bullocks was purchased during the year in addition to three pairs already in the farm.

1,940 maunds of artificial farm yard manure were prepared and 1,011 maunds 10 seers of joar and maize made into silage on the farm.

Maynaguri Farm.—Out of the total area of 23·07 acres, 2·45 acres being under buildings, roads, etc., 20·62 acres were available for cultivation.

Heavy rain in May, June and July after a long period of drought was not favourable for kharif crops. The fodder crops were destroyed due to constant rains. Prolonged drought from November affected rabi crops. Unusual showers in March again affected the yield and quality of tobacco.

Experimental cultivation.—(a) Economic Botanist's varietal test with aus and aman paddy and (b) Agricultural Chemist's varietal test with sugarcane were continued.

Non-experimental cultivation.—Aus and aman paddy, maize and oats and peas for fodder, dhaincha, and sunn-hemp for green manure, sunn-hemp for seed, Napier grass, rahar, potato, tori, pea for seed, lentil, English vegetables and tobacco were grown.

Kumari aus, and Dudsar and Iatisail aman paddy and Napier grass were grown on economic basis.

There are 4 pairs of bullocks in the farm. Their condition was good. During the year 173 maunds 30 seers of silage and 3,056 maunds of artificial farm yard manure were prepared. A pucca silo pit was constructed in the farm during the year.

Bogra Farm.—Out of the total area of 22·90 and 6·14 acres respectively in the Main and the Branch Farms, 16·73 and 5·40 acres were available for cultivation, the rest being occupied by buildings, roads,

tanks, etc. The weather was favourable on the whole for kharif crops. Heavy rainfall in October almost destroyed the rahar crops and seriously interfered with the preparation of lands for the rabi crops, the sowing of which was consequently delayed. Tobacco and vegetables were particularly affected. Oats and peas failed due to drought.

Experimental cultivation.—Economic Botanist's varietal tests with aus and aman paddies on the Main Farm and Agricultural Chemist's with sugarcane on the Branch Farm, were carried out. Agricultural Chemist's berseem experiment was practically a failure.

Non-experimental cultivation.—Aus and aman paddy, tori, tobacco, gram, Napier grass, sunn-hemp for green manure, were grown on the Main and Branch Farm; jute for seed, rahar, deola, groundnut, sugarcane, linseed, lentil and Patna peas were grown in the Branch Farm and English vegetables were grown on the Main Farm.

Latisail and Indrasail aman paddies were grown on economic basis. One of the farm bullocks died due to old age and two pairs of bullocks were purchased in March. 576 maunds of artificial farm yard manure were prepared.

One tube-well was sunk in the Branch Farm during the year.

Dinaipur Farm.—The season was not favourable for kharif crops. Sowing was delayed for want of rain in the beginning and interculture could not be done properly for heavy and continuous rain afterwards. Transplanted paddy in the lowlands was submerged and had to be retransplanted. Due to heavy rains accompanied with high wind in October the paddy in the lowlands, sugarcane, jute, vegetables and tobacco seedlings suffered badly. Paddy remained submerged for a couple of days. Sugarcane and jute for seed lodged. Rabi crops specially flax and lentil suffered on account of continuous drought from November to January. Lentil practically dried out in the field. Rabi crops, specially mustard, vegetables and tobacco, suffered much on account of severe attacks of insect pests.

Experimental cultivation.—(a) Economic Botanist's aus and aman paddies, varietal test, (b) Assistant Fibre Expert's highland and lowland flax experiments, (c) Agricultural Chemist's varietal tests with sugarcane, soil moisture experiments and experiments on the reclamation of alkali lands were carried out.

Non-experimental cultivation.—Aus and aman paddy, joar, maize, oats and peas and kheshari for fodder, Napier grass and Guinea grass, dhaincha and oats and peas for seeds, rahar, jute, lentil, tori, tobacco, and English vegetables were grown.

Aman paddy and English vegetables were profitably grown on 1.01 acres of land on economic basis. There were 8 bullocks and 1 stud bull on the farm and their condition was good. The stud bull served 57 cows during the year.

Silage—66 maunds 15 seers of joar were utilised for silo making.

About 900 maunds of artificial farm yard manure were prepared during the year.

5. Union Board Farms and Demonstration Centres.—This was the 2nd year of the scheme. There were in all 32 Union Board Farms and 98 Demonstration Centres in the rural areas in the Circle during the year under report. Each Agricultural Demonstrator was in charge

of 1 Union Board Farm and 3 Demonstration centres within a radius of 5 miles from his headquarters.

The following Cropping programmes were generally followed in the Union Board Farm and Demonstration Centres in this Circle with minor alterations in different districts according to the suitability of the soil and weather conditions:—

(a) UNION BOARD FARM.

Kharif.

Paddy—Area sufficient for 3 maunds of seeds.

Jute—1 bigha.

Fodder—Napier— $\frac{1}{2}$ bigha; joar or maize— $\frac{1}{2}$ bigha.

Rabi.

Gram, lentil, mustard, wheat and rabi fodder (oats and peas or Agartala kalai)—1 bigha each.

Tobacco—10 kathas.

Potato—6 kathas for old farm and 1 bigha for new farm.

English vegetables—10 kathas.

Special crops like linseed, groundnut in suitable areas.

Each owner of the new farm was given a grant of Rs. 50 to build a paddy gola and Rs. 10 for manure shed for conservation of cowdung.

(b) DEMONSTRATION CENTRES.

Kharif.

Paddy—30 bighas.

Fodder—Napier, joar or maize—3 bighas.

Green manure—5 bighas (if possible more).

Rabi.

Gram, Lentil, Mustard and Tobacco—2 bighas each.

Wheat, Patna peas (for grain), fodder (Agartala kalai or oats and peas)—1 bigha each.

Potato—6 kathas.

English vegetables—10 kathas.

There was also provision for construction of one silo pit by each Agricultural Demonstrator and for making of artificial farm yard manure and water-hyacinth compost. In all 41 improved ploughs and 32 handhoes were supplied and their use demonstrated. A total sum of Rs. 9,673-13-3 was spent during the year for the 32 Union Board Farms and 98 Demonstration Centres in this Circle. This excludes the value of seeds supplied free from Government farms. The Union Board farms according to the scheme, are in more or less compact blocks and owned by one man. These, therefore, served the purpose

of small seed stores in the rural areas and the large quantity of improved and recommended seed grown and stored there were distributed to the cultivators at reasonable prices.

In the Demonstration Centres a very large number of cultivators were brought in touch with the department's activities and they saw for themselves the utility of recommended seeds, manures and implements and the economic value of water-hyacinth compost, artificial farm yard manure and silage. Most of them preserved seeds for next sowing. In fact, these centres served the purpose of valuable advertisement and actually helped in the spread of improved crops and improved methods of culture. The Union Board Farms and Demonstration Centres well-served the purpose for which they were started.

A list of Union Board Farms and Demonstration Centres of this Circle with the result of work is given in Appendix I.

6. Premium System.—The system of payment of subsidy for the storage and sale of pure departmental seeds, introduced in 1938-39, was continued during the year under report. The scheme proved very successful in this Circle, inasmuch as, the farmers and jotedars received an incentive to grow more departmental seeds, store them inasmuch quantity as available and preserve them more carefully, specially in case of aus paddy which is very difficult to preserve, in a state of purity and good germination capacity. The bulk of the seeds that was stored for sale under this system was found to be fairly pure.

During the year 1,110 maunds 14½ seers of aus paddy, 642 maunds 22½ seers of aman paddy and 69 maunds 39 seers of rabi seeds were sold in this Circle and a sum of Rs. 677-10-9 was paid as premium to the seed-growers.

7. Private Farms.—In these farms seeds are taken from Government farms and crops grown under improved methods of cultivation. The seed is preserved for next sowing and the surplus sold to the neighbouring cultivators. So, these farms also serve as a very useful link between the Government farms and the rural population in the automatic expansion of improved and recommended crops and improved methods of cultivation. In order to maintain the purity of seed in these private farms, it is essential, that the owners should replace their seeds with the seed from Government farms at least after three years. According to the report of the District Agricultural Officers, as many as 59 private farms worth mentioning remained in touch with the Department and grew crops recommended by the Department during the year. These are distributed as follows:—

Rajshahi Sadar	... 4
Natore and Naogaon subdivisions	... 8
Rangpur	... 14
Dinajpur	... 6
Pabna	... 5
Jalpaiguri	... 9
Malda	... 6
Bogra	... 7
	—
	59
	—

• Short notes on some important private farms are given below:—

Rajshahi district.—(1) Char Srirampur Farm (in Sadar subdivision) of Md. Aphel Mondal of 63 bighas:—Marichbetty aus, gram S.4, Napier grass and Co. 213 sugarcane were grown over 9 bighas of land. He maintains pure type R. I. R. birds and Jumnapuri goats. In Damkura Exhibition, he received a prize for his cock, hen and eggs. He helped in the distribution of 13½ maunds of gram S.4 to the cultivators of his locality. (2) Pakri Farm of Maulvi Mr. Amiruddin Sheikh is in the Barind tract:—Out of the total area of 500 bighas, 150 bighas were put under Dudsar and 100 bighas under Jhingasail. (3) Matihar Farm in Sadar subdivision of Babu Birupakshya Guha, B.Sc.:—About 12 bighas were green-manured with sunn-hemp. Departmental aus, Kalimpong maize, joar, gram S.4, lentil No. 5, tori 7 were grown. He distributed 10 maunds of Marichbetty and Paspai aus paddy to the cultivators of his locality at Rs. 2-4 per maund. He has got R.I.R. and Leghorn birds. During the year he sold the following pullets and cockerels:—

	R.I.R.	Leghorn.
1. Pullets	... 24	6
2. Cockerels	... 15	5

(4) Basua Farm in Sadar subdivision of Babu Sashi Kumar Deb Barman:—Out of 100 bighas of the farm, 48 bighas were under departmental aus and aman paddy, Napier grass, Co. 213 sugarcane, etc., and 7 bighas under fruit. (5) Gopalpur Farm of the Gopalpur Sugar Mills Company supplies cane cuttings to the cultivators over a wide tract of land either on "Dadan" basis or on sale. (6) Mertala Farm of Babu Jitendra Bhusan Bhattacharjee is a small ideal farm, covering an area of about 43 acres where all kinds of recommended crops are grown under improved methods of culture, and seeds distributed to the neighbouring cultivators. Here, the interested cultivating class can see for themselves cultivation with departmental ploughs, hoes, etc. Gur-making with McGlashan furnace, irrigation with Petters Pump, making of silage and water-hyacinth compost. Sufficient fodder crops are grown in the farm and a Government breeding bull is maintained on the farm for the use of the neighbouring public.

Rangpur district.—(1) Ashu Babu's Farm is under Mithapukur thana—C.O. 213 cane, rahar, mustard, cowpea, and Indrasail were grown. (2) Madhab Chandra Bhoomick's Farm near Shyampur—Departmental jute, Indrasail paddy, C.O. 213 cane, Napier grass, Guinea grass, were grown. (3) Ambika Babu's Farm was managed by Babu Dharendra Mohan Roy Choudhury where Indrasail paddy flax, Napier grass, rahar and English vegetables were grown. (4) Dasherhat Farm—was managed by Maulvi Pasruddin Bepari, where Indrasail, Dhariail aus, cowpea and mustard were grown. (5) Maulvi Asmatullah's Farm in Nagdaha village—Departmental aus and aman paddies were grown. (6) Sailesh Babu's Farm at Katabari—Departmental cotton, rahar, tori and flax were grown.

Dinajpur District.—(1) In Kazipara Farm of Babu S. N. Sen Gupta with an area of about 1,200 bighas, though mainly a sugarcane farm, Departmental Kutaktara and Surjamukhi aus, Napier grass, cowpea and Dhaincha for green manure were also grown under

instructions of the District Agricultural Officer. Sugarcane of the farm is crushed in their factory, named Sen Gupta Sugar Factory. (2) Udaipur Farm of Babu Haridas Biswas and Babu D. N. Biswas near Raiganj Railway Station:—The area is about 1,200 bighas. Departmental Dudsar and Bhashamanik, Surjamukhi and Dhariāl, Joar and Napier, Dhaincha and cowpea for green manuring were grown. A bull from the Live-Stock Expert is also maintained in the Farm.

Pabna District.—(1) Pakuria Farm of Babu Nalini Ballav Mondal—area 50 bighas:—Dhariāl and P × S(8) aus, Bhashamanik aman, jute, joar, lentil, gram, tori, tobacco, and English vegetables were grown. Jute, joar and aman paddy seeds were supplied to the public. (2) Lakhikola Farm of Maulvi Tamizuddin Pramanik—area 200 bighas:—Indrasail, Tilakkachary aman and Dhariāl aus paddy, jute, lentils, gram and English vegetables were grown. (3) Dapunia Farm of Babu Promathanath Chobey—area 100 bighas:—The recommended crops grown were Dhariāl aus, jute, C.O. 213 sugarcane, wheat, gram, tori, tobacco, English vegetables and Darjeeling potato. (4) Taikula Farm of Maulvi Adali Khan—area 100 bighas:—The recommended crops grown were—Dhariāl aus, Latisail aman, jute, wheat, tori, tobacco, C.O. 213 cane, gram, lentil. (5) Malanchi Farm of Babu Haridas Sarker—area 60 bighas:—Departmental crops like Dhariāl aus, Indrasail aman, jute, wheat, tori, tobacco, gram, lentil, Darjeeling potato were grown.

Jalpaiguri District.—(1) Khandeswari Sugar Factory in Hossainbad of the Hon'ble Nawab Musharaff Hossain Khan Bahadur:—About 80 acres were under C.O. 213 cane. The canes were crushed by Peterson's K.B. type crusher and made into gur by open pan system. (2) Sikarpur Farm of Baikuntapur Raj Estate:—Cane of this farm was severely damaged by insect pests. New cane cuttings were newly indented from Berhampore Farm. (3) Kharia Gosala Farm:—About 300 cattle are maintained in the Farm. A considerable area is under Napier. Maize and joar were also grown for fodder. About 100 maunds of joar was made into silage during the year under supervision of the Agricultural Demonstrator, Jalpaiguri.

8. **Seed Farms.**—The private farms named above may also be treated as seed farms, as they supply seeds to the neighbouring cultivators. Besides these, there are big jotedars and cultivators who grew departmentally recommended crops and preserved seeds for sale. The names of the farms and of the seed growers with particulars of seed grown are given in Appendix II.

9. (a) **Seed Stores.**—There were seven seed stores in this Circle—one being attached to each of the Government Farms. Farm produce seeds and cuttings were mainly supplied to the public through these seed stores.

(b) **Private seed stores.**—There is no private seed store in this Circle but Messrs. R. Singh Brothers and Company, and O. Singh Brothers and Company of Jalpaiguri supplied Dhaincha seeds for green manure and joar, maize, castor-cake and chemical manures to the tea gardens and Government Farms.

Babu Jagannath Agarwala of Baneswar (Rajshahi) supplied joar, sunn-hemp, jute seeds, Marichbetty and Paspai aus and sugarcane cuttings to the public.

Babu Ranjit Sarker of Rajshahi town also stored and supplied oil-cake and chemical manures.

Jashai Nursery of Babu Ramchandra Roy of Rajshahi supplied during the year various sorts of country vegetable seeds and grafts.

10. (a) **Special Demonstration Work.**—In addition to the general programme of demonstration work carried on in the district, demonstration of gur-making with McGlashan furnace was done on cultivators' field in the districts. At Sonaikandi of Rajshahi Sadar, the furnace was prepared by the side of the local furnace, and boiling demonstration was successfully conducted. The cultivators fully realised the advantage of boiling cane jute in the improved furnace. In Naogaon subdivision of the Rajshahi district, the owners of the private farms of Mertala, Dayarampur, etc., also arranged this demonstration themselves.

The Agricultural Chemist, Bengal, also arranged Chaki-gur demonstration with McGlashan furnace in Pabna, Dinajpur and Naogaon (Rajshahi) with the help of the local District Agricultural Officers, and special staff engaged for the purpose.

Under instructions of the Assistant Fibre Expert, Bengal, 100 bighas of land were secured in the Gaibandha subdivision of Rangpur district and were put under flax. A special staff appointed for the purpose supervised the work. The crop was not as successful as it was expected, on account of continued drought. The total output of flax straw was purchased by the department.

Under instructions of the Second Economic Botanist, Bengal, a scheme for multiplication of mustard was taken up in the district of Rangpur. Actually about 170 bighas of land were put under Tori No. 7 in more or less compact blocks in three contiguous villages in the Barahazratpur Union. A special demonstrator supervised the work. Due to continued drought and attack of insect pests, the crop was not very successful. Only 200 maunds of mustard were available. The whole stock of mustard was purchased by the department and stocked in Barahazratpur for free distribution next year.

In Ganja Mahal of Naogaon subdivision of the Rajshahi district, 50 bighas of land were grown with long staple cotton under instructions of the Second Economic Botanist. An Agricultural Demonstrator was placed to supervise the crop, and its cultural operations. Due to heavy and continuous rain in June and July the crop over major portion of the area could not survive the water logged conditions. The crop in some plots, however, was found to be successful.

(b) Demonstration through lectures with or without the help of magic lantern, cinema shows, gramophone records and with samples of seeds, implements, charts and pictures were conducted in hats, exhibition grounds, and meetings called for in connection with Jute Restriction Propaganda, water-hyacinth week, and rural uplift work. A consolidated statement showing the places and number of lectures delivered and number of cultivators attending such lectures, is given in Appendix III.

11. **Exhibitions and shows in which the department participated.**—The scheme for award of prizes to best exhibitors of departmental crops in exhibitions was continued this year with greater success. A sum of Rs. 250 was originally provided for the purpose for prizes in

exhibitions held in each district. This was subsequently modified, and a lump grant for the whole Circle was allowed at the rate of Rs. 250 per district. The department participated generally in 2 exhibitions in each district. As expected, a larger number of cultivators paid greater attention to the production of better crops, manufacture of better fibre and gur, and keeping poultry and cattle in better condition. This was evinced from the exhibits brought in by the large number of cultivators. Such exhibits as aus and aman paddies, sugarcane, wheat, barley, gram, lentil, tori, tobacco, potato, English vegetables, jute fibre, gur, poultry, eggs, etc., were of much higher standard than in the previous year. Besides these exhibits brought in by the cultivators, the departmental exhibits of seeds, manures, implements, fibres, models, charts, etc., were also displayed in the exhibitions, and, leaflets and bulletins freely distributed there.

The prizes were awarded mostly in kind, i.e., improved seeds, manures, implements, gur-making accessories, improved cockerels and eggs and other articles of agricultural importance. This has been of great encouragement to the cultivators.

At Rangpur the agricultural stall was fully represented by exhibits of all sections of the department. The Hon'ble Chief Minister opened the exhibition. He was highly pleased to see the agricultural stall and showed special interest in the flax fibre and English vegetable exhibits, grown in the Demonstration Centres. Arrangements to show the agricultural film "Bhuler Phashal" were made by National Welfare Unit. This cinema show and the gramophone records on Jute Restriction also attracted thousands of visitors.

At Godagari and Dankurabat in Rajshahi Sadar the exhibitions were opened by the District Magistrate. The Godagari Exhibition Committee announced a prize of Rs. 16 to the owner of the Union Board Farms who showed the best result and it was equally divided between the owners of the Baneswar and Sonaikandi Union Board Farms, as the work of these two farms was thought to be equally good. Here also agricultural film and gramophone records of "Chasserpala" attracted thousands of visitors.

At Mahadevpur (Rajshahi) Exhibition, gur-making demonstration with McGlashan furnace was conducted for two days.

At Chatmohar Exhibition in the Pabna district, among other things, practical demonstration with Bengal Plough No. 2, artificial farm yard manure heap and water-hyacinth compost making was done.

At Mathurapur and Panchanandapur Exhibitions (Malda) a very good collection of agricultural exhibits was displayed. Lectures were arranged with magic lantern and gramophone records. The cultivators, who came in large numbers, were impressed to see the departmental exhibits. The Mathurapur Estate awarded a silver medal to the Agricultural Section.

12. Supply of seed manures and implements.—A consolidated statement showing the variety, quantity of seed manures and number of implements supplied for sale or free for demonstration, etc., is given in Appendix IV.

As a result of demonstration and propaganda and actual distribution of improved seeds and cuttings, the area under them has considerably increased. A statement showing the present area under improved crops is given in Appendix V.

13. The Agricultural Schemes worked out by the (1) Khas Mahal, (2) Court of Wards' Estate, (3) District Boards and (4) Agricultural Associations:—

(1) *Khas Mahal*.—The small Khas Mahal Farm at Khanjanpur in Bogra district was under supervision of a Departmental Agricultural Demonstrator. Departmental recommended crops—Aus and aman paddies, jute, sugarcane, mustard, lentil, gram and tobacco were grown on Borga system. The total expenditure of this farm was Rs. 50. Detailed statement is given in Appendix VI.

Jalpaiguri district.—One Agricultural Demonstrator maintained by the Khas Mahal and posted at Falakata and one Departmental Agricultural Demonstrator posted at Alipur Duar were in charge of the 3 Khas Mahal farms in kharif season. In rabi another Khas Mahal Agricultural Demonstrator was appointed and posted at Alipur Duars, and five farms under each of the two Khas Mahal demonstrators at Falakata and Alipur Duars were started. The total grant for the purpose was Rs. 1,750. The following cropping scheme was followed in each of the farm:—

<i>Kharif.</i>		<i>Rabi.</i>	
1. Dharial aus paddy	3 bighas	1. Mustard (tori 7)	.. 2 bighas.
2. Dudsar aman paddy	16 bighas	2. Wheat	.. 1—10 kathas.
3. Jute D. 154	.. 1 bigha	3. Oats and peas (fodder)	1—10 kathas.
4. Napier grass	.. 10 kathas	4. Matihari tobacco	.. 1 bigha.
5. Maize for fodder	.. 1 bigha	5. Darjeeling potato	.. 1 bigha.
		6. English vegetables	.. 10 kathas.

Besides, artificial farm yard manure heaps, silage and shed over manure pit were made in each farm.

Malda district.—One Agricultural Demonstrator is maintained by the Khas Mahal at Panchanandapur, where a small farm was started for demonstration of improved method of culture and multiplication of recommended seeds. A sum of Rs. 200 was sanctioned for the purpose. Improved seeds worth Rs. 50 was distributed among the Khas Mahal tenants. The Khas Mahal authorities also contributed Rs. 500 to the Panchanandapur Exhibition Committee to meet the incidental charges of the Agricultural Exhibition held at Panchanandapur. The Khas Mahal Demonstrator also supervised one Departmental Demonstration Centre at Panchanandapur.

Pabna district.—A sum of Rs. 1,000 was sanctioned for the improvement of agriculture in the Khas Mahal Estates. One Agricultural Demonstrator was appointed and posted at Mirkutia in last December for the purpose of giving advice to the Khas Mahal tenants on improved agriculture. Improved seeds, cuttings, manures and implements were distributed with the money available. Two stud bulls were also purchased. The details will be found in Appendix VI.

(ii) *Court of Wards' Estates*.—Dinajpur.—Only the Haripur Court of Wards' Estate took interest in organising an agricultural exhibition. No other work was done for improvement of agriculture by this or any other estate during the year.

(iii) No work was done by any District Board on agricultural improvement during the year.

(iv) The Rangpur Agricultural Association did not do any work during the year.

The Co-operative Agricultural Association at Naogaon (Rajshahi) maintained a small farm of 8 acres.

The details of work done during the year are given below :—

Name of crop.	Total area in acres sown under each crop.	Average outturn per acre.		Value of produce of each crop per acre.		Remarks.
		Md. sr. ch.	lbs.	Rs.	a. p.	
1. Dhariāl aus	3.33	13 33 0	1,133	27	7 0	
2. Dudsar aman	1.33	10 8 0	836	22	8 0	Badly damaged by flood.
3. C. G. jute	2.0	16 35 0	1,383	135	0 0	
4. D.154 jute	1.0	10 23 0	867	120	0 0	Partly damaged by drought.
5. Lentil	3.0	3 15 0	276	9	12 0	Affected by excessive rain at the harvesting time.
6. Darjeeling potato ..	0.16	79 0 0	6,478	132	0 0	
7. Pusa wheat	0.16	..	..	..	..	Harvesting not completed.
8. Sabour gram	0.66	..	..	..	..	Partly damaged by heavy rain during March.
9. Motihari tobacco ..	0.16	..	..	..	..	Harvesting not completed.
10. Onion	0.33	..	..	..	..	Ditto.
11. English vegetables ..	0.14	..	..	151	8 0	
12. Silkkim peas	0.02	..	..	85	5 0	

14. **Napier grass, artificial farm yard manure, water-hyacinth compost and silo.**—As usual, Napier grass was grown and artificial farm yard manure prepared in each farm but due to heavy rains green fodder suffered much in some farms.

Demonstration on making of silage, artificial manure and water-hyacinth compost were conducted extensively in the districts.

The statement regarding growing of Napier grass, making of silage, artificial manure and hyacinth-compost is given in Appendix VII.

15. **Sugar Factory.**—A list of Sugar Factories is given in Appendix VIII.

16. **Agricultural Education.**—The following schools had agricultural classes during the year under report :—

- (1) Basanta Kumar Agricultural Institute, Rajshahi.
- (2) Yusufpur Board M. E. School, Rajshahi.
- (3) Kharba M. E. School, Malda.
- (4) Shamshi M. E. School, Malda.

- (5) Tetulia M. E. School, Jalpaiguri.
- (6) Falakata M. E. School, Jalpaiguri.
- (7) Boda H. E. School, Jalpaiguri.
- (8) Dalgram M. E. School, Rangpur.
- (9) Ullapara H. E. School, Pabna.

17. Work in connection with Jute Restriction.—In course of general tours and in special meetings, lectures were delivered by the District Agricultural Officers, advising the Growers' to restrict jute cultivation according to the Government instructions. Lectures were also delivered with the aid of gramophone records supplied by the Special Officer for Jute Restriction, Bengal, and the contents of the records explained to the jute growers. No temporary staff was maintained, and no seed of substitute crops was distributed during the year for this purpose. The Agricultural Demonstrators and the Jute Committee staff helped the District Agricultural Officers in this connection.

18. Work of the staff for the Jute Areas under the Indian Central Jute Committee.—Main duties of the Jute Committee staff were:—

- (1) Thorough survey of jute markets and jute areas.
- (2) Annual turnover of jute.
- (3) Collection of Market details regarding price, weights, and measures, consumption, export and imports.
- (4) Costs incurred by local system of cultivation, retting, etc.
- (5) Local system of sale.
- (6) Allowances paid from cultivators to the balers.
- (7) Stock of jute remaining unsold, etc.—They had to collect and to submit informations required for taking measures for the improvement of marketing system, so that, the cultivators might get higher return for the jute grown.

The staff was engaged from the 11th April to the 3rd August 1939 in exploratory jute census work. They also checked the jute schedule submitted by the President of the Union Board and made crop-cutting experiments of jute crop. They also helped in the jute forecast work, and kept records of percentage of Olitorius and Capsularis varieties. They explained to the cultivators the importance of departmental seeds, method of preparation of artificial manure and water-hyacinth compost, and supplied recommended jute seed to the cultivators in addition.

19. Organisation of Co-operative Agricultural and Irrigation Societies.—The Lakhipur Irrigation scheme in the estate of Khan Bahadur Abul Hyat Khan Choudhury and the irrigation plant of Md. Musa Mistry at Sirisdanga in the Malda district worked well and good crops were grown by them. The Ranguvill Irrigation scheme in the estate of Babu Ishwar Lal Ghosh drawn up by the Agricultural Engineer, Bengal, is nearing completion.

20. Organisation of Sugarcane Growers' Co-operative Societies.—Towards the end of the year 1938-39 two Co-operative Unions known as Unions of Co-operative Sugarcane Growers' Societies were started at two important mill centres one at Gopalpur (Rajshahi) and the other at Setabganj (Dinajpur) with a view to improve the production of cane, and arrange sale of the cane, thus produced, to the mills, to the best advantage of the producers. Both Agricultural and Co-operative Staff

were appointed. The success of the scheme depended on the quality of the cane produced. The agricultural staff, therefore, looked to the improvement of cultural practices, to the selection of cane cuttings and to the use of manure and improved implements on selected plots for the purpose of demonstration.

In Gopalpur Centres, there were altogether 39 societies functioning during the year with 793 members on roll and 1,827 bighas under sugarcane. Some societies were organised during the latter part of the year and the total number of societies at the end of the year stood at 66. 294 maunds of Niciphos II obtained from previous year's grant were applied on the demonstration plots at the rate of 1 maund per bigha. The demonstration plots yielded remarkable results without exception. In all 33 Bengal No. 2 and 27 Sahkam No. 2 ploughs were purchased and supplied to the 60 societies of the union and their use demonstrated. In respect of the new planting, during the latter part of the year, demonstration of trench-planting and improved cultivation of ratoon cane were taken up. Already 132½ bighas of trench-planting and 73½ bighas of ratoon demonstration plots have been arranged for during the year. At the end of the year 190 maunds each of Sulphate of Ammonia and castor-cake meal were obtained for application on this year's demonstration plots.

In Setabganj Centre 19 new societies were registered; so, altogether 83 societies worked during the year with 1,588 members on roll and 3,248 bighas 10 kathas under sugarcane. Area under cane of 7 societies was not reported at the time of the report and as such, is not included in this report. At the end of the year the number of societies of this Union stood at 88.

165 maunds 25 seers of castor-cake, 44 maunds of Niciphos and 70 maunds of Ammonium Phosphate were distributed for demonstration purpose. 37 Sahkam plough No. 2 were supplied to the societies during the year. So, the societies of this union were now provided with 70 improved ploughs, including 33 supplied last year. In the demonstration plots, the planting was done either by trench system or by dropping alternate rows with sufficient spacing. The results, obtained in the demonstration plots, have been very encouraging, and the improved cultivation is gradually extending specially in Manmathapur centre.

The Sugarcane growers, though very conservative, appeared to be convinced of the utility of improved cuttings and use of manure. It is expected that with continued efforts it will be possible to popularise the use of manure, improved implements, selected cuttings, and also to introduce better cultural practices.

Due to bad weather conditions, sugarcane in lowland areas in the Gopalpur Centre lodged, and in the Setabganj area the crop was badly damaged by insect pests. So, the actual outturn of cane was below the quantity expected in the beginning.

In Gopalpur Centre the union contracted with the Gopalpur Mills, Limited, for the supply of 2 lac maunds of cane from the produce of the societies during this season, but, up to the end of the year the supply amounted to only 135,000 maunds. The supply during the season is not expected to exceed 1½ lac maunds. Excepting for a short period at the commencement of the season when the rates were annas 6-6 per maund for gate cane and annas 6 for rail cane, the rates per maund of cane throughout the rest of the year were annas 7-6 for

gate cane and annas 7 for rail cane. At the end of the year, however, rates increased due to scarcity of cane.

In Setabganj Centre, the union estimated an outturn of 3 lacs of maunds of sugarcane from the plots of the societies. But, on account of drought and severe attack of Borers and Pyrilla, the outturn was abnormally reduced. The actual outturn obtained was 150,000 maunds of cane only. Out of this quantity, 8,871 maunds 2 seers of cane were sold to the Sreeganga Sugar Mills of Setabganj, and 14,492 maunds 17 seers to the Setabganj Sugar Mills. The remaining quantity was crushed and made into gur. A portion of this was also used as setts for planting. The rate of cane sold was annas 8 per maund of gate cane and annas 7-6 per maund at out-stations.

An exhibition was held by the Setabganj Sugar Mills from the 11th to 13th March 1940. All arrangements were made by the mill authorities and the expenditure borne by them. The District Agricultural Officer, Setabganj, attended the exhibition. The main object was to encourage the cultivators to take up improved methods of cultivation. Practical demonstrations on improved method of planting, irrigation of crop from kutchha well and use of improved ploughs were done in the exhibition ground. Posters, charts on insect pests and different manures and fertilisers were exhibited in the stall. The growers, attending the exhibition, were informed about the methods of planting, manuring and controlling of insect pests, etc. As the exhibition was arranged too late in the season and could not be properly notified for shortness of time all the growers could not take part in it. 53 prizes in all were awarded to the best cane growers of the district. Three bullock carts, 2 Subkam plough No. 2, spades, and bags of manures were distributed as prizes.

21. **Acknowledgment.**—My thanks are due to all the Officials and Non-Officials who extended their co-operation in the discharge of my duties and thereby helped the department in the way of dissemination of improved method of scientific agriculture. Special mention may be made of the following Officials and Non-Officials, who rendered great help in popularising the work of the department among the cultivators:—

Officials.—Major I. Stewart, Deputy Commissioner, Jalpaiguri. Mr. A. S. Hands, Collector, Malda, Khan Bahadur M. Mahmud, late Collector, Pabna, Mr. A. Ahmad, Collector, Rajshahi, Mr. K. C. Basak, Collector, Bogra, Rai Bahadur S. N. Roy, Subdivisional Officer, Rangpur, and Khan Sahib M. Ahmad, Subdivisional Officer, Kurigram.

Non-Officials.—Babu Manmathanath Bhattacharya, President, Barahazratpur Union Board, and Maulvi Khondkar Abdul Karim, President, Annadanagar Union Board.

The District Agricultural Staff, who had to work very hard during the year, gave me their ungrudging support, and I take this opportunity of acknowledging their good services.

My Office Staff which was strengthened by the addition of 2 clerks gave a good account of themselves and rendered me full assistance.

S. ABDULLAH,

*Deputy Director of Agriculture,
Northern Circle, Bengal.*

APPENDIX I (a).

*List of Demonstration Centres and Union Board Farms, 1939-40
(Northern Circle).*

District.	Headquarters of Demonstrator.	Name of Demonstration Centres.	Name of Union Board Farm.
I. Rajshahi Sadar. (9 Demonstration Centres and 8 Union Board Farms.)	Rajshahi ..	1. Nahaganga ..	1. Sonakhandi.
		2. Poba.	
		3. Keogachi.	
	Baneswar ..	4. Kapasia ..	2. Namaigram.
		5. Hat-Sibpur.	
		6. Gram-Sibpur.	
	Godagari ..	7. Godagari ..	3. Matikata.
		8. Ujanpara.	
		9. Bhatapara.	
II. Naogaon Subdivision (9 Demonstration Centres and 2 Union Board Farms).	Naogaon ..	1. Kadua ..	1. Per-Naogaon.
		2. Jagatsingpur.	
		3. Sultanpur.	
	Naogaon (office) ..	4. Chakrampur.	
		5. Prijpur.	
		6. Ulashpur.	
Natore subdivision ..	Natore ..	7. Jangli ..	2. Hegalbaria.
		8. Faridpur Amhati.	
		9. Ratbari.	
III. Bogra (10 Demonstration Centres and 4 Union Board Farms).	Khanjanpur ..	1. Joypurhat ..	1. Ballaghata.
		2. Bhadsa.	
		3. Jamalpur.	
	Adamdighi ..	4. Adamdighi ..	2. Govindapur.
		5. Nasratpur.	
		6. Satingram.	
	Mokamtola ..	7. Mokamtola ..	3. Mokamtola.
		8. Deoli.	
		9. Kagali.	
	Bogra Branch Farm	10. Sabgan ..	4. Bejora.
IV. Pabna (9 Demonstration Centres and 3 Union Board Farms).	Ataikula ..	1. Raghunathpur Ataikula.	1. Ataikula.
		2. Telkupi-Madhpur.	
		3. Shibpur-Bisadpur.	
	Dasuria ..	4. Patilakhali ..	2. Muladali.
		5. Charmirkamari.	
		6. Baharpur-Dasuria	
	Serajganj ..	7. Khaga ..	3. Teghari.
		8. Serajganj.	
		9. Kandapara.	

APPENDIX I (a)—*contd.*

District.	Headquarters of Demonstrator.	Name of Demonstration Centres.	Name of Union Board Farm.
V. Malda (16 Demonstration Centres, 5 Union Board Farms).	Malda (Sadar) ..	1. Kumarpur ..	1. Lakhimpur.
		2. Kamalabari.	
		3. Malla.	
	Iho ..	4. Nachol ..	2. Iho.
		5. Bholahat.	
		6. Santali.	
	Harishchandrapur ..	7. Santoshpur ..	3. Harishchandrapur.
		8. Baraduari.	
		9. Shingole.	
	Kansat ..	10. Sibgonj ..	4. Kansat.
		11. Rajitpur.	
		12. Biswanath.	
	Nawabganj ..	13. Kalyanpur ..	5. Chak-Alampur.
		14. Durgapur.	
	Panchanandapur ..	15. Ramjibanpur.	
	Khas Mahal A. D. ..	16. Panchanandapur.	
VI. Dinajpur (12 Demonstration Centres, 4 Union Board Farms).	Dinajpur Sadar ..	1. Sulhari ..	1. Katapara.
		2. Maharajpur.	
		3. Diganbari.	
Sadar Subdivision ..	Raiganj ..	4. Raiganj ..	2. Goalpara.
		5. Baheln.	
		6. Kamalabari.	
Thakurgaon subdivision ..	Pirganj ..	7. Daulatpur (Vebra) ..	3. Mitrabati.
		8. Singarul.	
		9. Pirganj.	
Balurghat subdivision ..	Birampur ..	10. Shujapur ..	4. Mahmudpur.
		11. Daulatpur.	
		12. Kuchagram.	
VII. Rangpur (18 Demonstration Centres, 6 Union Board Farms).	Rangpur ..	1. Chilmohan ..	1. Chikilbhatta.
		2. Burirhat.	
	Mithapukur ..	3. Damodarpur.	
		4. Shatibari ..	2. Barahazratpur.
Sadar subdivision ..	..	5. Ranipukur.	
		6. Mithapukur.	
	Annadanagar ..	7. Khamerbaz ..	3. Annadanagar.
		8. Barspenisha.	
		9. Khamerpetbhata.	

APPENDIX I (a)—*concl'd.*

District.	Headquarters of Demonstrator.	Name of Demonstration Centres.	Name of Union Board Farm.
Kurigram subdivision ..	Kurigram ..	10. Kurigram .. 11. Belgacha. 12. Mogalbacha.	4. Kurigram.
Nilphamari subdivision ..	Nilphamari ..	13. Angarpara .. 14. Kamalkhata. 15. Ramnagar.	5. Kukhapara.
Gaibandha subdivision ..	Gaibandha ..	16. Udakhali .. 17. Lakhsipur. 18. Raydashbari.	6. Padamsahar.
VIII. Jalpaiguri (15 Demonstration Centres, 5 Union Board Farms).	Jalpaiguri ..	1. Pandapara .. 2. Senpara. 3. Panga.	1. Mandalghat.
	Malnaguri ..	4. Ulladabari .. 5. Madhabdanga. 6. Dakhin Ulladabari.	2. Tikkatuli.
	Patgram ..	7. Dhabalsuti .. 8. Kultali. 9. Bhanderdaha.	3. Jagotber.
	Panchagarh ..	10. Panchagarh .. 11. Jatanpukri. 12. Benghari.	4. Haripurmalan-dighi.
Allpur Duars subdivision ..	Allpur ..	13. Allpur Duars 14. Changpara. 15. Parurpar.	5. Changpara.
Total, 98 Demonstration Centres and 32 Union Board Farms.			

APPENDIX I (b).

A consolidated statement of results and cultivation cost, etc., of 18 Demonstration Centres in Rangpur district during the year 1939-40.

Name of district.	Number of Union Board Farms or Demonstration Centres.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Total approximate cost of cultivation.	Remarks.
Rangpur	18 numbers	Dhariai aus	36-00	Mds. sr. 739 39	Rs. a. p. 1,871 10 0	Rs. 1,080	Damaged in Kurigram and Gaibandha due to continued drought.
		Maize	6-00	2,146 25	428 8 0	120	
		Juar	6-00	1,987 25	372 13 0	114	
		Indrasail aman	72-00	1,632 7	4,017 10 0	1,447	
		Bhashamanik aman	72-00	1,536 36	3,688 0 0	1,447	
		Gram	12-00	118 6	303 1 0	180	
		Lentils	12-00	72 23	320 4 0	180	
		Mustard	12-00	31 36	221 10 0	180	
		Oats and peas	6-00	1,062 0	172 2 0	60	
		Wheat	6-00	57 11	270 4 0	120	
		Peas	6-00	32 4	151 14 0	90	
		Tobacco	12-00	104 0	1,144 8 0	900	
		Potato	1-80	307 10	801 0 0	270	
		Napier grass	6-00	1,590 0	345 5 0	270	
		English vegetables	3-00	..	275 0 0	180	

APPENDIX I (b)—*contd.*

A consolidated statement of results and cultivation cost, etc., of 6 Union Board Farms of Rangpur district for the year 1939-40.

Name of district.	Number of Union Board Farms or Demonstration Centres.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Total approximate cost of cultivation.	Remarks.
Rangpur	6 numbers	Dharial (aus)	6.00	Mds. sr. 144 17	Rs. a. p. 373 0 0	Rs. 180	
		Jute	2.00	38 16	476 4 3	200	
		Indrasail (aman)	16.00	315 36	775 6 0	328	
		Bhasamanik (aman)	16.00	315 10	766 1 0	328	
		Maize	2.00	701 0	85 0 0	40	
		Gram	4.00	18 32	85 4 0	60	Damaged in Kurigram and Nilphamari due to continued drought.
		Lentil	2.00	14 25	72 4 0	30	
		Mustard	2.00	8 19	67 11 0	30	
		Wheat	2.00	13 29	75 6 0	40	
		Tobacco	1.00	10 16	111 7 0	75	
		Potato	.60	97 35	242 1 0	90	
		Oats and peas	2.00	417 0	56 12 0	20	
		English vegetables	1.00	..	128 0 0	60	

The consolidated results of the crops grown in the Union Board Farms for the year 1939-40 in the district of Dinajpur.

Name of district.	Number of Union Board Farms and name.	Name of the crop grown.	Total area under each crop in acres.	Outturn of each crop both in mds. and lbs.		Total sale-proceeds.	Cost of cultivation.			Total.
				Md. sr. ch.	Lbs.		Government cost for supplying seeds and manures, etc.	Estimated cost for cultivators' cultivation.	Rs. a. p.	
Dinajpur	4	..	4	77 20 0	6,355	192 12 0	5 6 0	100 0 0	105 6 0	
	1. Katapara.	..	21.3	619 29 6	50,818	1,539 5 6	141 10 6	426 0 0	567 10 6	
	2. Mitrabati.	..	1.3	250 0 0	20,500	62 8 0	47 6 6	40 0 0	87 6 6	
	3. Goalpara.	..	1.3	220 10 0	18,060	55 1 0	6 10 0	15 9 6	22 3 6	
	4. Mamudpur.	..	1.3	26 37 0	2,207	269 4 0	39 6 0	58 8 0	97 14 0	
	6. Darjeeling potato	..	.63	95 17 8	7,825	238 9 6	90 15 0	18 14 9	109 13 9	
	7. Sabour gram No. 4	..	2.66	2 27 0	219	12 0 9	6 4 9	39 14 9	46 3 6	
	8. Lentil No. 5	..	1.33	5 0 0	410	17 8 0	2 12 9	19 15 3	22 12 0	
	9. Tori No. 7	..	1.33	2 5 0	174	15 15 0	1 5 9	15 15 0	17 4 9	
	10. Mothari tobacco	..	.66	6 8 0	509	46 9 6	13 9 3	19 12 9	83 6 0	
	11. English vegetables	..	.66	..	..	193 6 0	31 9 3	39 9 6	71 2 9
		Total	..	..	..	2,642 15 3	386 15 9	794 3 6	1,181 8 3

APPENDIX I (b)—*contd.**Results of Union Board Farms in the district of Jalpaiguri for the year 1939-40.*

Name of district.	Number of Union Board Farms or Demonstration Centres.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Cost of cultivation.	Remarks.
				Mds. sr. ch.	Rs. a. p.	Rs. a. p.	
Jalpaiguri ..	5 Union Board Farms.	Aus paddy (Dharial) ..	5.00	69 35 0	156 13 6	72 8 0	
		Maize for fodder ..	1.00	197 0 0	49 4 0	8 4 0	
		Jute D 154 ..	1.33	23 25 8	354 9 0	66 2 6	
		Dhaincha for green manure.	5.00	Ploughed down.	..	16 8 0	
		Arman paddy ..	26.66	658 20 0	1,433 14 0	521 1 6	
		English vegetables ..	0.66	..	143 0 0	35 0 6	
		Mustard T. 7 ..	3.33	13 8 0	77 12 6	10 14 0	
		Oats and peas for fodder	1.66	204 0 0	51 0 0	17 9 6	
		Potato (Darjeeling) ..	0.96	118 0 0	272 0 0	160 9 3	
		Wheat ..	1.66	13 13 0	62 0 0	13 10 9	
		Matihari Tobacco ..	1.66	17 13 0	252 6 0	91 11 6	
		Napier grass ..	1.10	291 0 0	72 12 0	38 1 0	

Results of Demonstration Centres in the district of Jalpaiguri for the year 1939-40.

Name of district.	Number of Union Board Farms or Demonstration Centres.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Cost of cultivation.	Remarks.
Jalpaiguri ..	15 Demonstration Centres.	Aus paddy (Dharial) ..	30-00	Mds. srs .ch. 419 25 0	Rs. a. p. 854 6 3	Rs. a. p. 435 0 0	.
		Maize fodder ..	10-00	1,584 35 0	401 2 0	82 8 0	
		Dhaincha for green manure.	29-94	Ploughed down.	..	173 4 0	
		Aman paddy ..	120-00	2,520 8 0	5,477 10 0	1,597 8 0	
		English vegetables ..	2-50	..	507 12 0	145 12 0	
		Potato (Darjeeling) ..	1-50	178 21 0	405 4 0	204 1 3	
		Mustard T. 7 ..	19-00	73 9 0	461 1 0	139 8 0	
		Oats and peas fodder ..	10-00	969 0 0	241 12 0	82 14 0	
		Napier grass ..	5-00	955 0 0	238 12 0	110 13 9	
		Wheat ..	10-00	58 38 0	295 2 0	82 0 6	
		Matihari tobacco ..	10-00	104 22 0	1,568 4 0	427 13 3	

APPENDIX I (b)—*contd.*

Consolidated statement showing results of crops grown in the Union Board Farms of Naogaon and Nator sub-district (district Rajshahi) during the year 1939-40.

Name of district.	Number of Union Board Farms.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.		Total sale-proceeds.	(Net of cultivation.	Government cost due to supply of seeds and manures.	Remarks. Estimated cultivator's cost for cultivation.	Total cost.
				Mds. ara. ch.	Cwt.					
Naogaon and Nator sub-district (district Rajshahi).	2	(1) Surjamukhl aus paddy.	1.49	43 10 0	31.66	110 0 0	Rs. a. p. 29 14 0	Seed 1 14 0	Rs. a. p. 28 0 0	Rs. a. p. 29 14 0
		(2) Katakara aus paddy	1.32	45 8 0	33.08	127 0 0	31 6 3	Seed 2 6 3	29 0 0	31 6 3
		(3) Dharial aus paddy	1.33	41 10 0	30.2	103 8 0	34 15 0	Seed 5 6 0	29 9 0	34 15 0
		(4) Indrasall aman paddy*	2.04	39 12 0	28.75	99 14 0	67 3 0	Seed 3 7 0 Manure 27 12 0	36 0 0	67 3 0
		(5) Dudsar aman paddy	2.71	60 30 0	44.46	163 0 0	86 5 0	Seed 5 0 0 Manure 39 5 0	42 0 0	86 5 0
		(6) Napier grass	0.32	13 0 0	9.51	6 8 0	9 0 0	Seed 1 0 0 Manure 4 0 0	4 0 0	9 0 0
		(7) Maize	0.325	140 0 0	102.50	70 0 0	5 12 0	Seed 1 8 0	4 4 0	5 12 0
		(8) Jute (C. G.)	0.66	15 0 0	10.98	130 0 0	36 0 0	Seed 2 0 0	34 0 0	36 0 0

(9) Lentil No. 5	..	0-66	10 20 0	7-08	47 4 0	9 0 0	Seed 1 2 0	7 14 0	9 0 0
(10) Gram (S-4)	..	1-32	18 5 0	13-26	63 4 0	15 8 0	Seed 3 0 0	15 8 0	18 8 0
(11) Mustard (Torl 7 and Ral 5).†		0-98	6 8 0	4-52	37 0 0	13 6 0	Seed 1 2 0	12 4 0	13 6 0
(12) Tobacco (Mathari)		0-32	5 0 0	3-65	43 0 0	22 10 0	Seed 0 2 0 Manure 12 0 0	10 8 0	22 10 0
							12 2 0		
(13) Darjeeling potato		0-132	48 14 0	35-41	59 0 0	44 12 0	Seed 20 4 0 Manure 14 0 0	10 8 0	44 12 0
							34 4 0		
(14) English vegetables		0-32	Not weighed		17 8 0	44 0 0	Seed 5 4 0 Manure 18 12 0	20 0 0	44 0 0
							24 0 0		

*In Naogaon subdivision aman paddies were damaged by heavy flood badly by 63 per cent.

†Mustard crop in Naogaon Union Board Farm was not successful due to unfavourable weather condition.

APPENDIX I (b)—contd.

Consolidated statement showing results of crops grown in the Demonstration Centres in Naogaon and Nator sub-district (district Rajshahi) during the year 1939-40.

Name of district.	Number of Demonstration centres.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.		Total sale-proceed.		Cost of cultivation.		Government supply of seeds and manures.		Remarks. Estimated cost for cultivation.		Total.	
				Mds. sra. ch.	Cwt.	Rs. s. p.	Rs. s. p.	Rs. s. p.	Rs. s. p.	Rs. s. p.	Rs. s. p.	Rs. s. p.	Rs. s. p.	Rs. s. p.	Rs. s. p.
Naogaon-Nator sub-district (district Rajshahi).	9	1. Dhariai aus paddy	16.40	328 7 0	240.35	818 0 0	346 2 0	71 2 0 (seed)	275 0 0	346 2 0	71 2 0 (seed)	275 0 0	346 2 0	346 2 0	346 2 0
		2. Surjamukhi aus ..	2.00	33 15 0	24.42	82 0 0	43 12 0	4 12 0 (seed)	39 0 0	43 12 0	4 12 0 (seed)	39 0 0	43 12 0	43 12 0	43 12 0
		3. Dudsar aman aus*	43.90	423 30 0	309.34	1,108 12 0	733 10 0	63 10 0 (seed)	670 0 0	733 10 0	63 10 0 (seed)	670 0 0	733 10 0	733 10 0	733 10 0
		4. Indrasali aman aus*	43.24	372 5 0	272.42	955 14 0	691 0 0	39 0 0 (seed)	652 0 0	691 0 0	39 0 0 (seed)	652 0 0	691 0 0	691 0 0	691 0 0
		5. Napier grass ..	3.0	50 0 0	36.60	25 0 0	65 0 0	9 0 0 (seed) 20 0 0 (manure)	36 0 0	65 0 0	9 0 0 (seed) 20 0 0 (manure)	36 0 0	65 0 0	65 0 0	65 0 0
		6. Joar	3.0	1,272 25 0	931.74	636 6 0	45 2 0	10 2 0 (seed)	35 0 0	45 2 0	10 2 0 (seed)	35 0 0	45 2 0	45 2 0	45 2 0
		7. Maize† ..	3.0	1,358 22 0	994.78	679 6 0	47 1 0	14 1 0 (seed)	33 0 0	47 1 0	14 1 0 (seed)	33 0 0	47 1 0	47 1 0	47 1 0
		8. Gram (S-4) ..	6.0	65 21 0	47.96	228 12 0	85 0 0	13 0 0 (seed)	72 0 0	85 0 0	13 0 0 (seed)	72 0 0	85 0 0	85 0 0	85 0 0
		9. Lentil No. 5 ..	6.0	84 8 0	61.63	378 8 0	84 13 0	10 13 0 (seed)	74 0 0	84 13 0	10 13 0 (seed)	74 0 0	84 13 0	84 13 0	84 13 0
		10. Mustard (torf 7 and ral 5).	6.0	32 29 0	23.92	158 4 0	76 13 0	4 13 0 (seed)	72 0 0	76 13 0	4 13 0 (seed)	72 0 0	76 13 0	76 13 0	76 13 0
		11. Wheat (P. 52) ..	3.0	35 22 0	26.01	177 8 0	76 5 0	18 5 0 (seed)	58 0 0	76 5 0	18 5 0 (seed)	58 0 0	76 5 0	76 5 0	76 5 0

12. Tobacco (hard).	6.0	56 30 0	41.54	511 0 0	216 4 0	2 4 0 (seed) 24 0 0 (manure)	190 0 0	216 4 0
13. Darjeeling potato.	0.29	48 4 0	35.21	75 0 0	62 2 0	26 4 0 30 4 0 (seed) 21 4 0 (manure)	10 0 0	62 2 0
14. English vegetables.†	1.47	Not weighed		79 14 0	123 11 0	52 2 0 23 11 0 (seed) 40 0 0 (manure)	60 0 0	123 11 0
15. Oats and peas (fodder).	3.0	205 0 0	150.08	102 8 0	40 8 0	63 11 0 8 4 0 (seed oats) 6 4 0 (peas)	25 0 0	40 8 0
16. Patna pea (fodder)	8.0	125 0 0	91.51	62 8 0	36 13 0	12 8 0 8 13 0 (seed)	25 0 0	36 13 0

*Due to heavy flood in Naogaon subdivision about 63 per cent. of Dudsar and Indrasail aman paddy crops were damaged badly.

†Out of 3.0 acres 2 acres were destroyed for want of protection and due to negligence of the growers.

‡Practically 75 per cent. of the produce was consumed by the growers.

Rai (No. 5)	..	1-00	2 14 0	21 2 6	15 0 0	In Ataikula Rai No. 5 in area of 3.2 acres damaged by mustard pest and late sowing.
Potato (Darjeeling)	..	0-30	37 0 0	93 0 0	30 0 0	
English vegetables	..	0-50	..	64 12 0	40 0 0	
Matihari tobacco	..	0-50	4 18 0	55 8 0	35 0 0	
Silage	..	1 No.	50 0 0	12 8 0	10 0 0	
Covered manure shed	..	3 Nos.	798 0 0	19 15 6	..	
Water-hyacinth (compost)	4 "		438 0 0	10 15 6	5 0 0	
*Artificial manure	..	7 "	576 10 0	14 6 6	4 0 0	

APPENDIX I (b)—*conold.*

Consolidated results of nine Demonstration Centres—Ataikula 3, Dasuria 3, Serajani 3—total 9 of Pabna district for the year 1939-40.

Name of district.	Number of Demonstration Centres or Union Board Farm.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceeds.		Cost of cultivation.		Remarks.
					Mds. srs. ch.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Pabna ..	Under A. D. Dasuria—	Kharif crops—							
	Iahurdi .. 1	Dharial aus paddy	18-00	404 5 0	1,212 6 0	550 0 0			
	Charmirkamari 2	Transplanted (Bhasamanik).	72-00	1,011 8 0	3,033 9 6	2,520 0 0			Actual area harvested. 49.33 acre failed due to increase of water just after aus planting.
	Chandpur .. 3	Joar (fodder) ..	6-00	3,038 0 0	159 8 0	....		
	Under A. D. Ataikula :—								
	Raghunathpur ..	Sunn hemp, Green manure.	15-00	Plough down	....	40 0 0			
	Ataikula .. 1	Napier grass ..	3-00	75 0 0	18 12 0	20 0 0			Actual area harvested. 0.76 acre failed due to continuous rain after planting.
Madpur, Telkupi and Putigara 2		Rabi crops— Wheat P-52 ..	3-00	43 25 0	174 8 0	125 0 0			

Shibpur Bisodpur and .. 3 Under A. D. Seraj- ganj—	Lentil No. 5 .. Gram (S-4) ..	6-00	46 25 0	163 3 0	120 0 0
Khaga 1	Peas (Patna white)	3-00	19 16 0	48 8 0	20 0 0
Serajganj .. 2	Oats and peas mixture	3-00	339 4 0	84 12 0	60 0 0
Kandapara .. 3	Rai No. 5 ..	5-33	11 22 0	69 5 0	....
Total 9					1-00 acres totally damaged in Atai- kula Centre due to attack of mustard pest and .25 acres damaged in Atai- kula due to above reason.
	Tori No. 7 ..	0-66	3 35 8	23 4 0	..
	English vegetables	1-50	..	258 2 0	190 0 0
	Darjeeling potato	0-90	131 35 0	263 8 0	100 0 0
	Matihari tobacco ..	6-00	39 0 0	507 0 0	400 0 0
	Silage ..	2 Nos.	110 0 0	27 8 0	20 0 0
	Covered manure shed	6 Nos.	1,208 0 0	30 3 6	12 0 0
	Water-hyacinth compost.	30 Nos.	2,851 0 0	71 4 0	30 0 0
	Artificial manure ..	52 Nos.	6,227 20 0	155 11 0	60 0 0

APPENDIX I (b).

Statement showing the results of Union Board Farms, district Bogra, for the year 1939-40.

Name of district.	Number of Union Board Farms.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Government cost for supply of seeds and manures, etc.	Cultivation. Estimated cost of cultivator's cost of cultivation.	Remarks.
Bogra	4	Dhariaus	4.00	Md. srs. ch. 82 0 0	Rs. a. p. 201 10 0	Rs. a. p. 5 0 0	Rs. a. p. 100 0 0	Manures of the total value of Rs. 287.10 were also distributed for different crops.
		Kumariaus	1.97	48 12 0	118 10 6	5 0 0	50 0 0	
		Jute C. G.	1.11	27 31 4	369 5 0	4 0 0	70 0 0	
		Joar	.48	90 0 0	22 8 0	1 5 0	5 0 0	
		Sunn-hemp G. M.	1.19	....	....	1 13 0	Green manure.
		Bhashamanik aman	12.00	280 30 0	697 7 0	3 12 0	216 0 0	
		Latishail	4.00	112 30 0	279 7 0	3 12 0	72 0 0	
		Napier grass	.49	140 0 0	35 0 0	1 0 0	10 0 0	
		Groundnut	.16	....	....	2 8 0	Result not yet obtained.
		English vegetable	.54	....	76 11 0	2 8 0	32 0 0
		Mustard	1.32	2 5 0	11 5 6	1 2 0	10 0 0	
		Tobacco	.64	6 0 0	51 2 0	0 8 0	40 0 0	
		Potato	.86	125 35 0	259 10 0	90 9 0	80 0 0	
		Lentil	1.32	7 2 8	21 10 3	1 13 0	20 0 0	
		Gram	2.64	16 10 0	46 6 0	4 3 0	32 9 0	
		Maize	.16	12 0 0	3 0 0	1 8 0	1 8 0	

APPENDIX I (b).

Statement showing the results of Demonstration Centres, district Bogra, for the year 1939-40.

Name of district.	Number of Demonstration Centres.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Government cost for supply of seeds and manures, etc.	Cultivation. Estimated cost of cultivation.	Remarks.
Bogra	10	Dhariai aus	10	Md. srs. ch. 223 27 0	Rs. a. p. 545 0 0	Rs. a. p. 25 0 0	Rs. a. p. 250 0 0	Manures of the total value of Rs 199.15.9 were also distributed for different crops.
		Kumari aus	10	228 9 8	552 8 0	25 0 0	250 0 0	
		Bhashamanik paddy.	70.32	1,406 39 8	3,453 6 9	65 10 0	1,266 0 0	
		Latishail	8	188 7 0	452 5 0	9 6 0	164 0 0	
		Joar	2.99	420 20 0	105 2 0	9 2 0	30 0 0	
		Maize	2.99	319 20 0	79 14 0	10 0 0	30 0 0	
		Sunn-hemp G. M.	4.00	.....	....	9 9 6	Green manure.
		Matihari tobacco	6.67	55 15 8	472 6 0	2 8 0	400 0 0	
		English vegetable	1.87	....	160 8 6	34 5 0	115 0 0
		Mustard	6.15	13 0 0	60 8 9	5 10 0	50 0 0	
		Peas	3.36	16 30 0	57 9 3	10 0 0	40 0 0	
		Oats and peas	2.33	143 5 0	53 1 0	16 4 0	28 0 0	
		Wheat	2.33	20 12 0	104 6 0	15 0 0	47 0 0	
		Lentil	7.42	39 37 0	121 13 3	8 12 0	87 0 0	
		Gram	6.94	53 5 0	150 5 0	10 7 6	84 0 0	
		Potato	.27	33 35 0	67 14 0	30 3 0	25 0 0	
		Napier grass	1.00	109 0 0	27 4 0	3 0 0	20 0 0	

APPENDIX I (b).
Results of Demonstration Centres for the year 1939-40.

Name of district.	Number of Demonstration Centres.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Cost of cultivation.	Remarks.
Malda	16	<i>Kharif.</i>		Mds. srs. ch.	Rs. a. p.	Rs. a. p.	
		Dhariai aus paddy ..	88	1,411 33 0	3,842 6 0	1,848 0 0	
		Indraesail aman paddy	72				
		Duddear aman paddy ..		1,103 20 0	2,758 12 0	1,080 0 0	
		<i>Rabi.</i>					
		English vegetables ..	2.66	....	556 2 0	262 8 0	Damaged by insects.
		Potato (Darjeeling) ..	2.00	175 20 0	351 0 0	157 8 0	
		Lentils, 5 ..	10.66	65 20 0	236 12 0	96 0 0	
		Patna white peas ..	5.33	38 8 0	117 13 0	49 8 0	
		Sabour gram ..	10.66	53 37 0	160 13 0	75 0 0	Damaged by insects.
		Mustard tori, 7 ..	10.66	62 10 0	311 4 0	101 0 0	Ditto.
		Wheat, P 52 ..	5.33	39 38 0	140 4 0	82 0 0	
		Motihari tobacco ..	10.66	97 35 0	792 2 0	371 0 0	Partially damaged by hail-storm.
		Napier grass ..	5.33	1,600 0 0	400 0 0	48 0 0	Partially damaged due to prolonged drought.
		Oats and peas (fodder)	5.33	480 0 0	1,200 0 0	80 0 0	

APPENDIX I (b).
Results of Union Board Farms for the year 1939-40.

Name of district.	Number of Union Board Farms.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Cost of cultivation.	Remarks.
				Mds. srs. ch.	Rs. a. p.	Rs. a. p.	
Malda	5	<i>Kharif.</i>					
		Dhariai aus paddy ..	11	208 20 0	625 8 0	264 0 0	
		Indrasail aman paddy ..	10.66	175 20 0	438 12 0	180 0 0	
		Dudsar aman paddy ..					
		Jute C. G. ..	1.66	21 30 0	244 0 0	20 0 0	
		Napier grass ..	1.66	650 0 0	....	30 0 0	
		<i>Rabi.</i>					
		English vegetables ..	0.82	....	194 0 0	50 0 0	
		Darjeeling potato ..	1.16	85 35 0	211 13 0	85 0 0	
		Motihari tobacco ..	0.82	13 10 0	114 0 0	38 0 0	
		Mustard tori, 7 ..	1.66	8 17 0	50 8 0	14 0 0	Crop damaged by insects.
		Linseed, 18B ..	1.66	11 35 0	56 0 0	19 0 0	
		Lentils, 5 ..	1.66	13 35 0	38 8 0	17 8 0	Crop damaged due to drought.
		Sabour gram ..	1.66	11 37 0	36 4 0	17 0 0	Ditto.
		Wheat, P 52 ..	1.66	15 27 0	54 14 0	23 8 0	

APPENDIX I (b).

Consolidated statement of results of 9 Demonstration Centres during 1939-40.

Name of district.	Number of Demonstration Centres.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Cost of cultivation.		Remarks.
						Government cost for supply of seeds and manures, etc.	Estimated cultivator's cost of cultivation.	
Rajshahi ..	9	Marichbuty aus ..	21.66	Mds. srs. ch. 450 21 8	Rs. a. p. 1,126 5 6	Rs. a. p. 54 8 0	Rs. a. p. 520 0 0	Fed to cattle.
		Paspai aus ..	21.66	439 29 4	1,099 5 3	54 8 0	520 0 0	
		Dudsar ..	18.33	1,109 26 8	2,027 2 6	60 7 6	371 4 0	
		Indrasail ..	11.33	235 38 8	589 14 6	24 3 6	229 8 0	
		Badkalamkathi (65).	1.33	35 30 0	89 6 0	1 9 0	27 0 0	
		Joar for fodder ..	6.00	1,092 0 0	....	13 12 0	90 0 0
		Sunn-hemp Green manuring.	15.00	....	....	55 11 0	90 0 0
		Gram (S.4) ..	6.00	46 38 8	176 1 9	11 13 0	63 0 0	
		Lentils, No. 5 ..	6.00	45 37 4	195 13 6	10 2 0	63 0 0	
		Wheat ..	3.00	24 16 4	122 0 6	16 14 0	45 0 0	
		Peas Patna White	3.00	21 3 4	73 11 0	5 14 6	45 0 0	
		Oats and peas fodder.	2.00	....	....	8 14 0	45 0 0
		Ditto ..	1.00	87 0 0	22 12 0	3 6 0	90 0 0	
		Mustard (Tori-7)	6.00	30 5 0	159 9 3	81 10 0	232 8 0	
		Mathari tobacco	5.165	....	....	109 8 0	26 5 3
		Darjeeling potato	0.88	55 8 8	147 10 6	54 15 0	79 3 0	
		English vegetables	1.20	6,559 cabbage and cauliflower and tomato	229 7 6			
		Napier grass ..	3.00	15 25 0	9 0 0	45 0 0	Not ready for harvest.

APPENDIX I (b).

Consolidated statement of results of 3 Union Board Farms during 1939-40.

Name of district.	Number of Union Board Farms.	Names of crops grown.	Total area under each crop in acres.	Outturn of each crop.	Total sale-proceed.	Cost of cultivation.		Remarks.
						Government cost for supply of seeds and manures, etc.	Estimated cultivator's cost of cultivation.	
				Mds. srs. ch.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Rajshahi ..	3	Marichbuty aus paddy.	3.00	64 20 4	161 4 3	28 10 0	24 0 0	
		Paspai aus paddy	2.00	50 22 8	126 6 6	28 10 0	16 0 0	
		Badkalamkathi (65)	1.00	21 7 8	52 15 6	2 12 6	20 4 0	
		Dudsar aman paddy.	0.66	18 22 12	46 6 9	5 2 9	13 8 0	
		Indrasail ..	1.32	33 28 4	83 10 3	7 11 9	26 8 0	
		C. G. Jute ..	0.99	17 30 12	173 15 0	3 3 0	23 0 0	
		Kalimpong maize for fodder.	0.66	143 23 0	28 15 9	3 7 0	10 0 0	
		Gram (S-4) ..	1.98	10 4 0	37 14 0	5 10 0	20 8 0	
		Lentils (No. 5) ..	0.99	9 36 12	40 15 6	1 11 0	20 12 0	
		Patna White peas	0.66	7 12 8	25 9 0	2 13 0	7 0 0	
		Ditto ..	.33	....	....	....	3 8 0	Fed to cattle.
		Mustard (Tor-7)	0.99	5 19 4	27 11 0	0 12 0	45 0 0	
		Agartala Kalai ..	0.66	....	....	1 8 0	6 0 0	Fed to cattle.
		Darjeeling potato	0.53	36 14 0	85 12 6	73 8 0	15 0 0	
		Mathari tobacco	.495	....	....	37 13 0	22 8 0	Not yet cured.
		English vegetables	.495	2,530 cabbage and cauliflower and tomato	106 10 9	18 12 0	33 0 0	
		Napier grass ..	.495	10 23 0	....	11 4 0	7 8 0	Not ready for harvest.

APPENDIX II.

List of the seed growers in the Northern Circle during the year 1939-40.

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Md. Afzal Hoque of Chakalam-pur.	Dharial aus paddy	50	50 0 0	24 0 0
	Lentils ..	..	5 0 0	4 0 0
	Sabour gram ..	..	10 0 0	8 0 0
	Mustard tori No. 7 ..	..	2 20 0	2 0 0
	Linseed ..	..	2 0 0	2 0 0
Md. Tasaddaque Hossain of Rajarampur.	Dharial aus paddy	10	20 0 0	10 0 0
Md. Reajaddin of Chapal-Nawabganj.	Ditto ..	5	10 0 0	8 0 0
Md. Naziruddin of Balladanga	Ditto ..	6	15 0 0	12 0 0
Md. Ishaque Molla of Baragharia.	Ditto ..	6	12 0 0	10 0 0
Md. Kalimuddin Biswas of Nawabganj.	Ditto ..	4	10 0 0	8 0 0
Emarat Hossain Choudhury of Iho.	Sabour gram ..	10	3 0 0	2 0 0
Md. Tamij Molla of Lalchandpur.	Ditto ..	2	2 0 0	1 0 0
Md. Ramjan Ali of Lalchandpur	Mustard tori No. 7	1	2 0 0	1 0 0
Md. Jabbar Ali of Chandipara	Ditto ..	1	2 0 0	1 0 0
Babu A. N. Roy of Bulbulchand	Sabour gram ..	100	3 0 0	1 0 0
	Pusa wheat ..	100	2 0 0	1 20 0
	Mustard tori No. 7	100	2 0 0	1 0 0
	Dharial aus ..	100	8 0 0	6 0 0
Rameswar Mandal of Santail ..	Mustard tori No. 7	5	2 0 0	1 0 0
	Dharial aus ..	2	4 0 0	3 0 0
Md. Tafrulla Mandal of Balladanga.	Ditto ..	8	30 0 0	20 0 0
Md. Jesuruddin Mandal of Ballapukur.	Ditto ..	3	6 0 0	4 0 0
Kuma Rajbanshi of Santail ..	Sabour gram ..	1	2 0 0	1 20 0
Lalit Ram Bhakat of Nachole ..	Ditto ..	10	10 0 0	7 0 0
	Wheat pusa 52 ..	10	3 0 0	2 0 0
	Mustard tori 7 ..	..	2 0 0	2 0 0
	Dharial aus ..	..	6 0 0	4 0 0
Manik Lal Kunda of Surala ..	Sabour gram ..	14	4 0 0	3 0 0
	Mustard tori No. 7	2	2 20 0	2 0 0
	Pusa wheat ..	..	2 0 0	1 0 0
	Dharial aus ..	..	12 0 0	9 0 0

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Md. Latif Hossain of Lakhimpur	Mustard tori No. 7	100	2 20 0	2 0 0
	Pusa 52 wheat ..	..	4 0 0	2 18 0
	Linseed ..	..	2 20 0	2 2 0
	Lentils No. 5 ..	..	2 0 0	1 30 0
	Sabour gram ..	..	6 0 0	5 10 0
	Dhural aus ..	..	90 0 0	60 0 0
Goanath Mondal of Kajlgram ..	Mustard tori 7 ..	5	1 0 0	0 30 0
Suresh Mondal of Kajlgram ..	Lentils ..	3	1 0 0	1 0 0
Babu Khirode Gopal Roy of Kajlgram.	Dhural aus ..	50	10 0 0	7 0 0
	Sabour gram ..	3	2 10 0	2 10 0
	Lentils 5 ..	..	2 20 0	2 0 0
	Pusa wheat 52 ..	..	2 0 0	1 0 0
	Tori No. 7 ..	..	2 20 0	2 0 0
	White Patna peas ..	..	2 0 0	1 0 0
Subid Molla of Kumarpur ..	Lentils 5 ..	2	1 0 0	0 20 0
	White Patna peas ..	4	1 0 0	1 0 0
Juran Sk. of Alalpur ..	Dhural aus ..	..	15 0 0	13 0 0
Sekaruddin Biswas of Sakarma	Sabour gram ..	4	1 20 0	1 0 0
	Mustard tori 7 ..	4	1 20 0	1 1 8
	Pusa 52 wheat ..	..	1 20 0	1 5 0
Kabatulla of Sakarma ..	Lentils ..	..	2 0 0	2 0 0
	Wheat pusa 52 ..	1	1 0 0	0 38 0
Md. Inus ..	Lentils ..	1	1 0 0	1 0 0
	White Patna peas ..	..	2 20 0	2 20 0
Rahman Saita of Raipur ..	Tori No. 7 ..	4	1 0 0	1 0 0
	Patna peas ..	..	1 0 0	1 0 0
Bhupen Sha of Raipur ..	Wheat pusa ..	..	1 20 0	1 0 0
	Sabour gram ..	..	2 20 0	2 20 0
	Wheat pusa 52 ..	3	2 20 0	1 20 0
Ghista Dalal of Raipur ..	Lentils 5 ..	1	2 20 0	2 0 0
Tinkari Pahar ..	Patna peas ..	1	1 20 0	1 20 0

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Maresh Paharia of Kumarpur	Dharial aus ..	5	8 0 0	6 20 0
Gaffar Ali Molla of Kumarpur	Ditto ..	2	6 0 0	5 0 0
Rahim Mahalat of Kumarpur	Ditto ..	1	4 0 0	3 10 0
Abdul Sarker of Kumarpur	Ditto ..	1	3 22 0	3 20 0
Manik Mahalat of Raipur ..	Ditto ..	1	3 20 0	3 10 0
Sabik Pukar of Gobindapur ..	Dharial aus paddy	1	3 0 0	2 10 0
Khorsedall of Gobindapur	Ditto ..	3	8 0 0	6 10 0
Naimuddin of Fulhari ..	Ditto ..	2	6 0 0	5 20 0
Farzan Ali Mia of Kamalabari	Ditto ..	2	7 0 0	6 0 0
Radhu Chandhari of Fulhari ..	Ditto ..	$\frac{1}{2}$	3 0 0	2 0 0
Patu Chandhari of Fulhari ..	Ditto ..	2	6 0 0	5 20 0
Mangu Moral of Malia ..	Ditto ..	2	6 0 0	5 30 0
Khokarant of Malia ..	Ditto ..	$\frac{1}{2}$	3 0 0	2 0 0
Babu Khirode Gopal of Bholarhat.	Ditto ..	25	24 0 0	18 20 0
Jaidhar Das of Bholarhat ..	Ditto ..	5	6 0 0	4 0 0
Chand Khatli of Bholarhat	Ditto ..	1	3 0 0	3 0 0
Jagannath Mali of Bholarhat	Ditto ..	1	3 0 0	3 0 0
Shadhu Matri of Santali ..	Ditto ..	$\frac{1}{2}$	2 20 0	2 0 0
Aridhar Mandal of Santali ..	Ditto ..	$\frac{1}{2}$	2 20 0	2 0 0
Gabinda Das of Tho ..	Ditto ..	1	33 0 0	3 0 0
Bugana Ram of Tali ..	Ditto ..	1	3 0 0	3 0 0
Babu Sudhir Ch. Roy of Harishchandrapur.	Ditto ..	15	28 0 0	20 0 0
<i>Rangpur District.</i>		Bighas.		
Babu Panchanan Sirkar, Ranipukur.	Indrasail ..	10	95 0 0	....
	Bhashamanik ..	10	105 0 0	....
	Dharial ..	15	120 0 0	....
Md. Golam Ghaus, Burirhat	Indrasail ..	8	72 0 0	....
	Bhashamanik ..	10	93 0 0	....
	Dharial ..	10	74 0 0	....
Babu Girindra Nath Mandal ..	Indrasail ..	10	82 0 0	....
	Bhashamanik ..	15	120 0 0	....
	Dharial ..	10	73 0 0	....
Md. Rahimuddin Khandkar, Kurigram.	Indrasail ..	8	73 20 0	....
	Bhashamanik ..	8	74 0 0	....
	Dharial ..	8	58 20 0	....

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
		Bighas.	Mds. srs. ch.	Mds. srs. ch.
Babu Haranath Biswas, Nilphamari.	Indrasail ..	10	72 30 0	....
	Bhashamanik ..	10	80 25 0	....
	Dharia ..	8	68 0 0	....
Babu Golokeswar Bhattacharji, Itakumari.	Indrasail ..	8	74 0 0	....
	Bhashamanik ..	8	73 25 0	....
	Dharia ..	6	45 30 0	....
		Acre.		
Babu Manmatha Nath Bhattacharji, Barabazarpur, Rangpur.	Dharia ..	1	10 0 0	5 0 0
	Aman ..	3.33	50 0 0	5 0 0
	Rabi ..	1.66	12 0 0	8 0 0
Babu Panchanan Sarker, Ranipukur.	Dharia ..	2	10 0 0	5 0 0
	Aman ..	2.66	30 0 0	5 0 0
	Rabi ..	2	10 0 0	8 0 0
Jatia Shikari, Dilapara ..	Aman ..	0.66	10 0 0	5 0 0
Maulvi Jamiruddin, Nasirabad	Ditto ..	1.66	10 0 0	5 0 0
Md. Keramat Sheikh, Balupara	Dharia ..	0.66	10 0 0	5 0 0
Md. Karim Jamadar, Nasirabad	Ditto ..	1.66	15 0 0	5 0 0
Dr. Jaluddin, Shatgara ..	Aman ..	1.66	15 0 0	12 0 0
Md. Kheru Sheikh, Niamat ..	Ditto ..	2	10 0 0	4 0 0
Shaharall, Chilmohan ..	Ditto ..	1.66	6 0 0	4 0 0
Md. Kamuddin Miah, Katchna	Dharia ..	1.66	8 0 0	4 0 0
Md. Umar Uddin, Katchna ..	Ditto ..	1.33	5 0 0	4 0 0
Md. Araj Ali, Katchna ..	Ditto ..	1.33	6 0 0	4 0 0
Md. Kheru Sheikh, Niamat ..	Ditto ..	1.33	8 0 0	4 0 0
Md. Safutullah Sheikh, Niamat	Ditto ..	1.33	6 0 0	4 0 0
Md. Rahim Uddin Khandakar, Belgacha.	Aman ..	1.33	15 0 0	4 0 0
	Dharia ..	2.66	20 0 0	8 0 0
Md. Gafuruddin Ahmad, Madhab Ram.	Aman ..	1	5 0 0	3 0 0
Md. Delar Hossain, Kurigram	Ditto ..	1	10 0 0	7 0 0
Md. Basaruddin Bepari, Nidhiram.	Ditto ..	1.33	10 0 0	6 0 0
Md. Gafuruddin Ahmad, Madhab Ram.	Dharia ..	0.66	5 0 0	3 20 0
Md. Fazler Rahman, Karimer Khamer.	Ditto ..	0.66	5 0 0	4 0 0
Md. Pashiruddin, Harikesh ..	Ditto ..	1.33	10 0 0	4 20 0
Md. Maheruddin, Udukhal	Aman ..	2	15 0 0	12 0 0
	Dharia ..	1.66	18 0 0	11 0 0

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Md. Maheruddin, Udukhali ..	Rabi ..	1.33	16 0 0	8 0 0
Md. Azemuddin, Roydasbari ..	Aman ..	1.66	13 0 0	8 0 0
	Rabi ..	1.33	8 0 0	6 0 0
	Dhariai ..	1.33	9 0 0	5 0 0
Girindra Nath Mandal, Udukhali	Rabi ..	0.66	2 30 0	2 0 0
Md. Nabtullah Mia, Krenchipara	Dhariai ..	1.33	7 0 0	4 0 0
Mv. Khandakar Abdul Karim, Anandanagar.	Ditto ..	3.33	90 0 0	8 0 0
	Aman ..	6.66	174 0 0	5 0 0
	Rabi ..	3	19 0 0	5 0 0
Md. Shahar Ali Mia, Khamerpetbhata.	Dhariai ..	1	20 0 0	8 0 0
	Aman ..	1	28 0 0	5 0 0
	Rabi ..	0.66	5 0 0	3 0 0
Md. Shamsarali Mia, Panisla ..	Dhariai ..	2	50 0 0	1 0 0
	Aman ..	4	100 0 0	10 0 0
Babu Phani Bhusan Goswami, Kukhapara.	Dhariai ..	1	20 0 0	5 0 0
	Aman ..	4	100 0 0	5 0 0
Md. Kafur Ali Sarker, Angarpara	Ditto ..	1.33	40 0 0	5 0 0
	Dhariai ..	1	15 0 0	5 0 0
Babu Surendra Nath Das, Kantalkata.	Ditto ..	0.66	10 0 0	5 0 0
	Aman ..	2.66	20 0 0	5 0 0
Rasul Muhammad Sarker, Ramnagar.	Ditto ..	3.33	40 0 0	5 0 0
	Dhariai ..	1	15 0 0	5 0 0
<i>Jalpaiguri District.</i>				
Prohlad Agarwala, Garailbari ..	Bhasamanik ..	15.00	240 0 0	4 0 0
	Dhariai ..	.66	8 0 0	....
Rajamohan Roy, Dhupguri ..	Charnak ..	3.00	38 0 0	....
	Dudsar ..	25.00	450 0 0	....
Indu Bhusan Chatterji, Binna-guri.	Indrasail ..	15.00	250 0 0	....
Abdul Karim, Dhupguri ..	Katakara ..	3.00	40 0 0	....
	Indrasail ..	6.00	96 0 0	....
Murari Mohan Thakore, Panchagarh.	Charnak ..	1.00	12 0 0	....
	Dudsar ..	10.00	140 0 0	....

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
A. Sovan, Falakata ..	Dharial ..	8.00	120 0 0	....
	Dudsar ..	15.00	225 0 0	....
	Indrasail ..	12.00	168 0 0	....
Keramat Ali, Tikatuli, Maynaguri.	Dudsar ..	4.00	60 20 0	9 20 0
	Bhashamanik ..	.33	5 32 0	....
	Latisail ..	3.00	80 0 0	....
	Dharial ..	6.00	114 0 0	19 0 0
Samiruddin, Maynaguri ..	Dudsar ..	1.00	14 0 0	6 20 0
Ahad Ali, Maynaguri ..	Ditto ..	1.00	13 20 0	4 8 0
	Bhashamanik ..	.66	12 0 0	....
Isamuddin Prodhan, Mangalghat	Dudsar ..	5.33	80 0 0	9 35 0
	Bhashamanik ..	.66	10 0 0	..
	Dharial ..	.00	15 0 0	9 0 0
Khagendra Nath Roy, Mangalghat.	Dudsar ..	1.50	10 0 0	2 0 0
Kumar Matindra Narayan, Jalpaiguri.	Ditto ..	1.33	20 0 0	10 0 0
Tarani Bhatt, Kharia Gosala ..	Ditto ..	.66	10 0 0	5 20 0
	Dharial ..	.33	7 0 0	4 0 0
Basudev Sen, Jalpaiguri ..	Dudsar ..	1.50	20 0 0	5 20 0
Akbar Ali, Jalpaiguri ..	Ditto ..	1.33	20 0 0	8 0 0
Indu Bhushan Sarma, Jalpaiguri	Ditto ..	2.66	40 0 0	9 0 0
	Dharial ..	1.50	10 0 0	4 0 0
Md. Basara, Jalpaiguri ..	Dudsar ..	1.50	10 0 0	4 15 0
Derazuddin, Panchagarh ..	Ditto ..	3.00	48 0 0	19 0 0
	Bhashamanik ..	1.00	16 0 0	....
	Indrasail ..	.66	12 0 0	....
	Dharial ..	1.00	12 0 0	14 0 0
	Latisail ..	3.00	48 0 0	....
Rafizuddin, Panchagarh ..	Dudsar ..	4.00	64 0 0	10 0 0
	Latisail ..	.66	12 0 0	....
	Bhashamanik ..	1.00	14 0 0	....
Sibaprosad, Panchagarh ..	Dudsar ..	4.00	58 0 0	28 20 0
	Latisail ..	.50	9 0 0	....
Basiruddin, Panchagarh ..	Dudsar ..	4.33	55 0 0	18 0 0
	Latisail ..	.50	9 0 0	....
	Dharial ..	.66	6 0 0	2 0 0
Harimohan, Jalpaiguri ..	Ditto ..	.66	6 0 0	4 0 0
Kumar Pulln Narayan, Jalpaiguri.	Ditto ..	1.50	20 0 0	12 0 0

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Hajrat Mohammad, Allpurduar	Dharial ..	·66	8 0 0	6 0 0
Churankali, Jalpaiguri ..	Ditto ..	·66	4 0 0	1 0 0
Nani Gopal Roy, Jalpaiguri ..	Ditto ..	·66	4 0 0	2 0 0
Mahraddin, Patgram ..	Ditto ..	·66	14 0 0	7 0 0
Bongu Mohammad, Panchagarh	Ditto ..	·66	5 0 0	2 0 0
Debendra Nath Gop, Panchagarh	Ditto ..	·66	4 0 0	2 0 0
Kazimuddin, Panchagarh ..	Ditto ..	·66	3 0 0	2 20 0
Imanuddin, Panchagarh ..	Ditto ..	·66	6 0 0	2 0 0
Hamiljuddin, Panchagarh ..	Ditto ..	·66	5 0 0	2 0 0
Mujiruddin, Panchagarh ..	Ditto ..	·66	4 0 0	2 20 0
Khosaiuddin, Panchagarh ..	Ditto ..	·66	4 20 0	2 0 0
Majiruddin, Panchagarh ..	Ditto ..	·66	6 0 0	3 0 0
Henanta Burman, Panchagarh	Ditto ..	·66	3 0 0	1 0 0
Rashanath Burman, Panchagarh	Ditto ..	·66	3 0 0	1 0 0
Hossain Ali, Maynaguri ..	Ditto ..	2·66	36 0 0	17 0 0
<i>Dinajpur District.</i>				
Indu Bhusan Mondol, Palashbari, Birampur.	Dharial ..	1·66	20 0 0	6 0 0
	Dudsar ..	33·33	400 0 0	20 0 0
	Bhashamanik ..	..	....	....
Kabir Shaha, Mamudpur, Birampur.	Dharial ..	·66	13 0 0	1 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	·66	25 0 0	....
	Bhashamanik ..	..	....	....
Bejoy K. Sarkar, Khoyarbari, Birampur.	Dharial ..	2·66	42 0 0	7 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	..	....	....
	Bhashamanik ..	2·00	32 0 0	....
Kisori Mohan Sarker, Khoyarbari, Birampur.	Dharial ..	5·00	64 0 0	9 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	13·33	175 20 0	20 0 0
	Bhashamanik ..	..	....	....
Mohammad Sha, Mamudpur, Birampur.	Dharial ..	1·33	24 0 0	6 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	3·33	50 0 0	....
	Bhashamanik ..	..	....	....

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Monomohan Sarker, Khoyarbari, Biratpur.	Dhariai ..	3.33	44 0 0	10 10 0
	Surjamukhi ..	..	....	....
	Dudsar ..	1.00	180 0 0	....
	Bhashamanik ..	..	....	....
Kalabania Hazra, Batpaligaon, Pirganj.	Dhariai ..	1.33	22 10 0	3 10 0
	Surjamukhi ..	..	....	....
	Dudsar ..	2.00	32 0 0	....
	Bhashamanik ..	..	....	....
Samsuddin Mohammad, Bagungaon, Pirganj.	Dhariai ..	..	....	....
	Surjamukhi ..	.66	11 0 0	1 0 0
	Dudsar ..	1.00	18 20 0	....
	Bhashamanik ..	..	....	....
Asharuddin Sharker, Begungaon, Pirganj.	Dhariai ..	1.00	14 0 0	2 10 0
	Surjamukhi ..	..	....	....
	Dudsar ..	1.33	25 0 0	....
	Bhashamanik ..	..	....	....
Asanali Sharker, Batpaligaon, Pirganj.	Dhariai ..	.66	12 0 0	3 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	3.33	60 0 0	4 20 0
	Bhashamanik ..	..	....	....
Mobarakali Sarker, Birhali, Pirganj.	Dhariai ..	1.00	18 0 0	7 0 0
	Surjamukhi ..	..	....	....
	Dhariai ..	1.00	21 0 0	....
	Bhashamanik ..	..	..	....
Madhusudan Ghose, Chapore, Pirganj.	Dhariai ..	1.00	15 0 0	3 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	1.33	10 0 0	....
	Bhashamanik ..	..	....	....
Kashiruddin Ahummad, Mitrabati, Pirganj.	Dhariai ..	3.00	42 0 0	9 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	3.33	63 0 0	....
	Bhashamanik ..	..	....	....
Amedali Sharker, Begungaon, Pirganj.	Dhariai ..	.33	6 20 0	6 30 0
	Surjamukhi ..	..	....	....
	Dudsar ..	.33	6 20 0	....
	Bhashamanik ..	..	....	....
Manindra B. Roy, Shaguny, Pirganj.	Dhariai ..	3.33	50 0 0	10 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	6.66	90 0 0	....
	Bhashamanik ..	..	....	....

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Afajuddin Ahammed, Goalpara, Raiganj.	Dhariai ..	4-00	65 0 0	10 10 0
	Surjamukhi ..	..	....	....
	Dudsar ..	13-33	200 0 0	60 0 0
	Bhashamanik ..	..	....	....
Ramamth Das Kutapara, Dinajpur.	Dhariai ..	2-66	44 20 0	10 20 0
	Surjamukhi ..	..	....	....
	Dudsar ..	8-33	100 0 0	13 0 0
	Bhashamanik ..	..	....	....
Soleman Ahammed, Suhari, Dinajpur.	Dhariai ..	1-66	20 0 0	4 20 0
	Surjamukhi ..	..	....	....
	Dudsar ..	5-00	70 0 0	....
	Bhashamanik ..	..	....	....
Jahiruddin Ahammed, Maharajpur, Raiganj.	Dhariai ..	1-00	13 0 0	3 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	3-33	52 0 0	....
	Bhashamanik ..	..	....	....
Bhupendra Kumar Roy, Dighanbari, Dinajpur, Roybati.	Dhariai ..	2-66	34 0 0	3 0 0
	Surjamukhi ..	..	....	....
	Dudsar ..	6-66	80 0 0	....
	Bhashamanik ..	..	....	....
Kadem Motter Rahman, Veltore, Pirganj.	Dhariai ..	-66	11 0 0	..
	Surjamukhi ..	..	....	....
	Dudsar ..	3-33	52 0 0	9 20 0
	Bhashamanik ..	..	....	....
Hagaru Mohammad Mondal, Mitrabati, Pirganj.	Dhariai ..	2-66	27 0 0	....
	Surjamukhi ..	..	....	....
	Dudsar ..	5-00	90 0 0	5 0 0
	Bhashamanik ..	..	....	....
Shashi Bhushan Roy, Shaguna, Pirganj.	Dhariai ..	1-66	20 0 0	....
	Surjamukhi ..	..	....	....
	Dudsar ..	..	....	....
	Bhashamanik ..	8-33	125 0 0	10 0 0
Jania Mohammed, Nandanpur, Pirganj.	Dhariai ..	1-00	16 0 0	....
	Surjamukhi ..	..	....	....
	Dudsar ..	1-66	30 0 0	4 0 0
	Bhashamanik ..	..	....	....

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Sadar Mohammed, Goagaon, Pirganj.	Dharial ..	66	14 0 0	....
	Surjamukhi ..	..	....	....
	Dudsar ..	1.33	24 0 0	7 0 0
	Bhashamanik ..	..	....	....
Kartie Ch. Roy, Baultair, Raiganj.	Dharial ..	66	9 0 0	....
	Surjamukhi ..	..	....	....
	Dudsar ..	3.33	60 0 0	5 0 0
	Bhashamanik ..	..	....	....
<i>Raishahi district.</i>				
Jagannath Agarwalla, owner, Namazgram Union Board Farm.	Marichbuty ..	7.33	20 24 0	19 20 0
	Paspai ..	..	15 20 0	12 20 0
	Dudsar ..	..	6 0 0	....
	Indrasail ..	..	10 0 0	....
Samiruddin Mandal, owner, Sonaikandi Union Board Farm.	Marichbuty ..	15.0	25 12 8	9 0 0
	Paspai ..	..	24 25 4	5 0 0
	Indrasail ..	..	16 13 4	....
	Dudsar ..	..	9 7 12	....
Adyanath Majumdar, owner, Mahishabari Union Board Farm.	Marichbuty ..	6.50	15 15 0	....
	Paspai ..	..	20 31 0	....
	Badkahanukathi (65) ..	..	21 7 8	....
Akhmuddin Molla, Ujanpara Farm.	Marichbuty ..	13.5	20 0 0	17 0 0
	Paspai ..	..	20 0 0	19 0 0
	Dudsar ..	..	30 0 0	....
	Indrasail ..	..	3 0 0	....
Panchai Mandal, Harupur, Nabaganga.	Paspai ..	20.0	6 18 0	6 0 0
Sabiruddin Mandal, Nabaganga	Marichbuty ..	15.0	11 5 0	0 20 0
	Paspai ..	..	6 23 8	0 20 0
Teabuddin Mandal, Nabaganga.	Marichbuty ..	10.0	6 38 0	3 0 0
	Paspai ..	..	7 11 12	2 0 0
Khudi Mandal, Keogachi ..	Marichbuty ..	15.0	6 35 8	1 20 0
	Paspai ..	..	6 24 12	1 20 0
Meeher Mandal, Nabaganga ..	Ditto ..	8.0	8 6 0	3 0 0

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Babu Haran Chandra Ghosh, Hogulbaria, P. O. Natore.	Kataktara ..	12.0	30 0 0	....
	Surjamukhi ..	..	40 0 0	22 0 0
	Dharial aus paddy ..	..	10 0 0	....
	Dudsar aman ..	..	25 0 0	25 0 0
	Indrasail aman ..	..	20 0 0	....
	Wheat (P. 52) ..	..	4 0 0	....
	Patnai peas ..	..	4 0 0	....
	Gram (S-4) ..	..	4 0 0	1 0 0
	Tori No. 7 ..	..	2 20 0	....
	Rai No. 5 ..	12.0	2 0 0	....
	Lentil No. 5 ..	..	2 0 0	1 0 0
Bhubon Mondal, Natore, Katua-para.	Dharial ..	3.2	15 0 0	5 0 0
	Aus paddy ..	..	....	....
	Dudsar aman ..	..	15 0 0	....
Monish Chandra Shaha, Jangli, Natore.	Dharial aus ..	8.3	20 0 0	4 0 0
	Dudsar aman ..	..	16 0 0	....
Lalbulia Pramanik, Faridpur Anahati, Natore.	Dharial aus ..	7.0	16 0 0	8 0 0
Bricharan Sarker, Par Naogaon, Naogaon.	Ditto ..	8.3	15 0 0	5 0 0
	Kataktara aus ..	..	6 0 0	....
	Dudsar aman ..	..	40 0 0	28 0 0
	Gram (S-4) ..	..	3 0 0	2 20 0
	Wheat (P. 52) ..	..	3 0 0	2 0 0
	Lentil No. 5 ..	..	5 0 0	2 0 0
	Tori No. 7 ..	..	5 0 0	2 20 0
Samiruddin Mondal, Jagatsinghpur, Naogaon.	Dudsar aman ..	4.0	30 0 0	24 0 0
Mafiz Fakir, Sultanpur, Naogaon	Ditto ..	3.0	20 0 0	12 0 0
Mongaluddin Mondal, Kadoa, Naogaon.	Ditto ..	10.0	20 0 0	11 0 0
<i>Bogra district.</i>				
Hatemali Mandal, Bogri ..	Musuri ..	0.5	2 20 0	1 20 0
	Kumari aus ..	0.5	16 35 0	15 20 0
	Dharial aus ..	1.2	36 20 0	18 0 0
	Bhashamanik aman ..	3.0	101 10 0	79 20 0
	Latisail aman ..	1.0	33 0 0	7 30 0
Haji Kudrat Ali, Magnipara ..	Dharial aus ..	0.25	10 20 0	7 30 0

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Aejuddin Mandal, Magnipara	Kumari aus ..	0·33	15 0 0	3 10 0
Kailash Ch. Mandal, Jantigram	Ditto ..	0·33	5 4 0	2 10 0
	Bhashamanik ..	0·5	10 0 0	3 30 0
Kailash Ch. Das, Hatil ..	Kumari aus ..	0·17	5 20 0	1 5 0
Tufanu Mandal, Panditpur ..	Ditto ..	0·4	12 0 0	1 20 0
Girdhar Das, Khanjanpur ..	Bhashmanik ..	0·5	9 20 0	1 20 0
Benode Behari Pramanik, Bejora.	Kumari Aus ..	0·5	8 10 0	8 2 8
	Dharial Aus ..	1·0	9 0 0	2 25 0
	Bhashamanik ..	3·0	31 20 0	9 7 8
	Latisail ..	1·0	12 0 0	2 25 0
Sakabar Sarder, Durgapur ..	Dharial aus ..	0·34	10 0 0	1 32 0
Aej Sarder, Durgapur ..	Kumari aus ..	0·34	9 20 0	1 32 0
Bisa Mandal, Baghari ..	Dharial aus ..	0·25	8 0 0	0 25 0
Lapra Pramanik, Baghari ..	Kumari aus ..	0·3	9 0 0	1 8 0
Mostullah Khan, Vebra ..	Ditto ..	0·3	8 25 0	1 5 0
Hatemuddin Pramanik, Amjani	Ditto ..	0·5	15 0 0	13 8 0
	Dharial aus ..	1·0	31 0 0	12 30 0
Amirali Bhatra, Deoli ..	Ditto ..	0·34	9 0 0	2 0 0
	Bhashamanik ..	0·34	8 5 0	4 20 0
M. Jahiruddin, Kagail ..	Dharial aus ..	0·34	12 0 0	4 10 0
Ahmad Ali, Kagail ..	Ditto ..	0·34	12 25 0	3 5 0
Mahendra K. Das, Kagail ..	Ditto ..	0·34	11 15 0	1 0 0
	Kumari aus ..	0·34	10 0 0	5 0 0
Motrajali Mandal, Sultanpur ..	Bhashamanik ..	0·34	8 0 0	5 20 0
	Kumari aus ..	0·25	7 20 0	4 20 0
Surendra N. Pal, Kagail ..	Dharial aus ..	0·34	18 0 0	2 10 0
Khudu Mandal, Kalchak ..	Ditto ..	0·4	10 5 0	4 0 0
<i>Pabna district.</i>				
Abdul Jabbar, Kandapara, Serajganj.	Dharial aus ..	16·66	10 0 0	7 0 0
	Lentil No. 5 ..	..	1 20 0	1 0 0
	Gram (S-4) ..	..	2 20 0	2 5 0
	Tori No. 7 ..	..	0 20 0	0 20 0
	Wheat P-52 ..	..	0 25 0	0 23 0
	Agartalakalai ..	..	1 20 0	1 20 0

APPENDIX II—*contd.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Maizuddin Biswas, Atalkula ..	Wheat P-52 ..	20	2 30 0	0 32 0
	Lentil No. 5 ..	..	3 0 0	0 22 0
	Gram S-4 ..	..	2 10 0	0 6 0
	Dharial aus ..	..	25 0 0	18 0 0
Ahmed Ali Molla, Seraiganj ..	Ditto ..	6.66	10 0 0	6 0 0
Osman Ghani Talukder ..	Ditto ..	10	15 0 0	10 0 0
Azgar Ali Talukder ..	Ditto ..	8.66	7 0 0	3 0 0
Sakenderali Pramanik ..	Ditto ..	3.33	3 0 0	1 0 0
Rahmuddin Mohammed ..	Ditto ..	5	6 20 0	2 0 0
Memrat Ali Talukder ..	Ditto ..	11.66	22 20 0	20 0 0
Wahed Ali ..	Ditto ..	6.66	6 25 0	3 0 0
Aduir Khan, P. O. Atalkula, VIII. Modpur, Pabna.	Lentil No. 5 ..	8.33	2 30 0	0 35 0
	Wheat P-52 ..	..	3 0 0	1 34 0
Tazimuddin Molla, P.O. Atalkula, VIII. Bisadpur.	Ditto ..	6.66	1 0 0	0 20 0
Ebrahim Pramanik, Atalkula	Dharial aus ..	3.33	7 5 0	3 0 0
Rafikuddin Pramanik, Atalkula	Ditto ..	9.33	9 0 0	6 0 0
Sital Pramanik ..	Ditto ..	4	3 0 0	0 30 0
Kazem Pramanick ..	Ditto ..	2.66	6 30 0	3 30 0
Jalil Khan ..	Ditto ..	6.66	5 10 0	2 10 0
Ager Pramanik ..	Ditto ..	7.38	6 30 0	3 0 0
Babu Sider ..	Ditto ..	8	6 25 0	3 0 0
Moher Ali ..	Ditto ..	9.66	22 0 0	10 0 0
Dwarik Ghose ..	Ditto ..	10	6 35 0	2 20 0
Belat Khan, Atalkula ..	Ditto ..	5	6 10 0	1 20 0
Karir Molla, Atalkula ..	Ditto ..	3.33	3 0 0	2 0 0
Sree Ramjal Pal, Atalkula ..	Ditto ..	8.33	6 25 0	3 0 0

APPENDIX II—*concl.*

Name and address of seed growers.	Variety of seed grown.	Area of the farm in acre.	Quantity of seed raised.	Quantity sold on premium basis.
1	2	3	4	5
			Mds. srs. ch.	Mds. srs. ch.
Babu Amrita Lal Chakravorty, Ishurdi.	Dharial aus ..	23.66	12 0 0	9 0 0
	Tori No. 7 ..	..	6 0 0	0 20 0
	Lentil No. 5 ..	..	4 30 0	0 10 0
	Gram S-4 ..	..	5 30 0	0 10 0
Bhakat Ram, Ishurdi ..	Dharial aus ..	6.66	4 30 0	2 0 0
Panjab Ali Khan, Ishurdi ..	Ditto ..	20	3 10 0	3 0 0
Mafiz Fakir, Ishurdi ..	Ditto ..	5	6 10 0	4 0 0
Wazed Ali Shaik, Ishurdi ..	Ditto ..	6.66	6 20 0	6 0 0
	Tori No. 7 ..	..	1 10 0	0 20 0
	Gram S-4 ..	..	2 20 0	0 20 0
	Lentil No. 5 ..	..	3 0 0	1 0 0
	Wheat P-52 ..	..	1 20 0	0 20 0
Fakiruddin, Ishurdi ..	Dharial aus ..	3.33	4 0 0	2 0 0
Garimuddin Biswas, Ishurdi ..	Ditto ..	10	15 0 0	11 0 0
	Tori No. 5 ..	..	0 12 8	0 12 8
	Gram S-4 ..	..	1 0 0	0 20 0
	Wheat P-52 ..	..	0 25 0	0 15 0
	Lentil No. 5 ..	..	1 20 0	0 30 0
Bahadur Mandal, Ishurdi ..	Dharial aus ..	5	6 30 0	5 0 0
Kabir Biswas	Ditto ..	6	2 30 0	2 0 0
Rajabali Sarker	Ditto ..	6.66	6 35 0	5 0 0
Tajuddin Ahammed, Ishurdi	Ditto ..	8.33	15 0 0	10 0 0
	Tori No. 7 ..	..	0 20 0	0 15 0
	Lentil No. 5 ..	..	1 5 0	0 25 0

APPENDIX III.

Exhibition and Lantern Lectures (1939-40) in the Northern Circle.

Name of district.	Name of place of the shows.	Number of lantern lectures held.	Number of cultivators attending the lectures.
Rajshahi Sadar ..	Keogachi	1	150
	Mashkatadighi	1	500
	Sonaikandi	1	250
	Durgapur	1	100
	Damkurahat	1	300
	Sahpur	1	100
	Ramchandrapurhat	1	500
	Andharkotha	1	400
	Boodhpara	1	300
	Bargachi	1	1,000
	Mohanpur	1	2,000
	Mundumala	1	1,500
	Godagari	1	1,500
	Bidirpur	1	250
	Taherpur	1	500
	Bugha	1	3,000
	Pananagar	1	500
	Dainkurahat	1	4,000
Naogaon	Kurigram	2	500 average.
Natore	Ullashpur	1	100
(Rajshahi)	Sultanpur	2	100 Do.
	Par-Naogaon	2	70 Do.
	Kadoa	1	90
	Hogalbaria	1	75
	Lalpur	2	700 Do.
	Dhariai	1	400
	Mohadevpur	2	700 Do.
Bogra Sadar	Kagail	1	250
	Amjani	1	200

APPENDIX III—contd.

Statement showing places and number of lectures delivered and average number of cultivators attending lectures in each place during the year 1939-40, district Pabna.

Name of place.	Number of lectures.	Average number of cultivators attending lectures in each place.
Ataikula	2	200
Tekupi	2	100
Saradangi	1	95
Putigara	2	90
Madpur	2	100
Bisadpur	2	85
Shibpur	2	150
Raghunathpur	2	250
Ishurdi	2	100
Patilakhali	2	115
Dasuria	2	300
Khaga	1	95
Kadimpara	1	100
Bakua	1	100
Mohanpur	1	90
Satbaria-Nischintapur	1	95
Tarabaria	1	200
Hapani	1	80
Haturia	1	75
Shazadpur	2	200
Parkola	1	70
Chatmohar	3	500
Taras	1	125
Sujanagar	1	150
Rajnayanpur	1	175
Charmirkapur	1	100
Ramchandrapur	1	95
Lakhikola	2	..
Serajganj	3	175
Kazipur	2	80
Hossainpur	2	150
Haripur	1	90
Bahuli	1	95
Raipur	1	65
Muladuli	1	100
Naricha	1	70
Tengra	1	60

APPENDIX III—*contd.*

Name of place.					Average number of cultivators attending lectures in each place.	
					Number of lectures.	
Machpara	..	..	..	..	1	100
Baradhul	..	..	..	..	1	80
Ullapara	..	..	..	..	2	200
Lahirimohanpur	..	..	..	..	2	75
Sara	..	..	..	..	1	80
Maizbari	..	..	..	..	1	70
Khanmarich	..	..	..	..	1	75
Masudia	..	..	..	..	1	65
Bera	..	..	..	..	2	250
Mirkutia	..	..	..	..	2	275
Hutail	..	..	..	..	2	100
Pakuria	..	..	..	..	1	115
Roypur	..	..	..	..	1	75
Chalkpailanpur	..	..	..	..	1	200
Sanerdiah Char	..	..	..	..	1	250
Barapangashi	..	..	..	..	1	150
Silinpur	..	..	..	..	1	100
Aminkhola Mela	..	..	..	..	1	350
Jamtail	..	..	..	..	1	100
Kowak	..	..	..	..	1	95
Bhattakowak	..	..	..	..	1	115
Anyatpur	..	..	..	..	1	80
Srikhola	..	..	..	..	1	115
Chauhail	..	..	..	..	1	125
Chandrakuna	..	..	..	..	1	100
Banagram	..	..	..	..	1	100
Paikurbati	..	..	..	..	1	115
Dublia	..	..	..	..	1	200
Durgapur	..	..	..	..	1	100
Debattar	..	..	..	..	1	125
Bagura	..	..	..	..	1	75
Ghusuria	..	..	..	..	1	50
Sambhandin	..	..	..	..	1	100
Dhaminagar	..	..	..	..	1	50
Dapunia	..	..	..	..	1	100
Teghuri	..	..	..	..	1	95
Total					95 lectures.	

APPENDIX III—*contd.*

Name of district.	Name of place of the shows.	Number of lantern lectures held.	Number of cultivators attending the lectures.
Bogra Sadar	.. Sherpur ..	1	200
	Panchbibi ..	1	500
	Kajla ..	1	450
	Bogra ..	1	500
	Dakhin Khagrabari ..	1	150
	Panchagarh ..	1	200
	Jalpesh ..	1	500
	Do. ..	1	500
	Jaigany ..	1	200
	Kaliaganj ..	1	100
	Balurghat Bazar ..	1	100
	Rahia Bazar ..	1	50
	Birampurhat ..	1	400
	Fatezungpur ..	1	100
	Alokdighi dāk bungalow ..	1	100
	Raiganj ..	3	4,000
	Haripur ..	3	5,000
	Nilphamari ..	(150) 100 to 1,000 cultivators.	
	Kurigram ..		
	Haragacha ..		
	Annadanagar ..		
Rangpore	.. Darwani ..		
	Kumarpetbhata ..		
	Domar ..		
	Padansabar ..		
	Udakhali ..		
	Raidashbari ..		
	Kaniaikhata ..		
	Angarpara ..		
	Ramnagar ..		

APPENDIX III—concl'd.

Statement showing the place and number of lectures delivered by the District Agricultural Officer in the district of Malda during the year 1939-40.

Serial No.			Name of place.		Average number of cultivators attending lectures.
1	Jadupur	150
2	Lakhipur	400
3	Bulbulchandi	250
4	Sujapur	300
5	Peasbari	200
6	Herishchandrapur	350
7	Panchanandapur	500
8	Jhaubana	650
9	Nurpur	125
10	Chanchal	350
11	Nachole	250
12	Syampur	350
13	Biswanathpur	150
14	Shioganj	350
15	Mathurapur	1,000
16	Kansat	400
17	Samsi	200
18	Bhaluka	500
19	Kamalabari	250
20	Kumarpur	100
21	Bholarhat	350

APPENDIX IV.

Statement of seeds, manures and implements supplied for sale and free demonstration in the Northern Circle during the year 1939-40.

Name of seeds and manures, etc.	Quantity sold.	Quantity supplied free for demonstration.	
		Mds. srs. ch.	Mds. srs. ch.
Aus paddy	333 25 3	201 14 0	
Aman paddy	535 34 2	295 23 0	
Jute seeds	3 2 8	0 36 12	
Maize seeds .. ..	....	18 5 0	
Lentils	14 35 0	28 38 0	
Gram	42 25 12	32 19 0	
Peas	0 4 0	26 3 0	
Oats .. ..	....	27 20 0	
Wheat	9 33 10	42 25 8	
Rahar	7 16 0	....
Cowpea .. ..	....	13 20 0	
Agartala kalai	2 32 0	0 18 0	
Tobacco seeds	130½ tolas	165 tolas	
Mustard	0 32 13	9 37 8	
Joar	0 7 8	16 36 0	
Dhaincha .. ..	....	10 20 0	
Darjeeling potato .. ..	....	137 20 0	
Sunn Hemp .. ..	....	9 0 0	
Groundnut	3 26 12	0 20 0	
Vegetable seeds .. ..	....	2,638 packet	
Castor cake	0 35 0	124 0 0	
Bonomeal	12 5 0	48 34 0	
Niciphos	5 22 0	297 22 0	
Amo Phos .. ..	....	4 0 0	
Sulphate of ammonia	3 5 0	41 25 0	
Improved plough	3 Nos.	36 Nos.	
Hand hoes	7 Nos.	26 Nos.	
Sugarcane cuttings	60,175 Nos.	....
Paddy seedlings	420 Nos.	....
Vegetable seedlings	1,192 Nos.	....
Tobacco seedlings	650 Nos.	....
Plaintain sucker	104 Nos.	....

APPENDIX V.

Statement showing the area under principal improved crops during 1939-40 in the Northern Circle, Bengal.

Name of crops.				Area in 1938-39.	Area in 1939-40.
Aus paddy	..	..	..	16,228	17,595
Aman paddy	..	..	..	194,817	216,910
Sugarcane	..	..	..	104,501	120,513
Motihari tobacco	..	..	..	4,403	5,604
Wheat	..	..	..	1,492	1,608
Gram	..	..	..	1,032	1,249
Napier grass	..	..	..	624	498
Oil-seeds	..	..	..	861	1,223
Darjeeling potatoes	..	..	..	1,471	1,186
Kalai	..	..	..	731	788

APPENDIX VI.

Activities of the Court of Wards, Khas Mahal, District Boards, etc., in connection with the improvement of Agriculture, for Jalpaiguri district, during the year 1939-40.

[illegible]

APPENDIX VI.

Activities of the Court of Wards, Khas Mahal, District Boards, etc., in connection with the improvement of Agriculture, for Pabna district, during the year 1939-40.

Name of district.	Name of agencies.	Distribution of seeds in quantity.	Contribution and grant.	Number of Agricultural Demonstrators appointed and maintained.
1. Pabna	Khas Mahal ..	122 mds. aus paddy seeds 66,000 Nos. sugarcane cuttings. 5 mds. fodder seeds.	Rs. 1,000	One Agricultural Demonstrator for 4 months from December 1939 to March 1940.
2. Pabna	Court of Wards ..	....	..
3. Pabna	District Board ..	....	..
4. Pabna	Agricultural Association.	....	..
		Total for the district ..	1,000	
Bogra	Khanjanpur Khas Mahal Estate.	Musur .. 5 srs. Gram .. 6 srs. Mustard .. 1 sr. Jute— Olltorius .. 2 srs. Capsularies .. 8 srs.	Rs. 50. This sum was spent by the Khas Mahal Estate for seeds, manures, etc. for the farm.	Nil. The Departmental Agricultural Demonstrator, Khanjanpur, supervised the work of the Khas Mahal Farm.

N. B.—Two brooding bulls have been purchased for Rs. 140 :—

- (1) One cross Montgomery bull from Rautara, police-station Shahzadpur, for Rs. 55.
- (2) One cross Hisser bull for Rs. 85.

APPENDIX VII.

Statement showing the production of Napier grass cuttings, farm yard manure, silage and water-hyacinth compost in the Northern Circle, Bengal, during the year 1939-40.

				Mds. srs.
Napier grass cuttings produced in Government Farms—				
Quantity of cuttings produced	..	..		604 30
Quantity planted in farm	..	..		31 30
Quantity supplied free	..	..		405 0
Quantity sold .. .. .	..	..		168 0
Artificial farm yard manure—				
Quantity made in Government Farm	..	..		10,846 0
Quantity made in Demonstration Centres		..		28,996 20
Water-hyacinth compost—				
Quantity made in Government Farm	..	..		100 0
Quantity made in Demonstration Centres		..		12,977 0
Silage—				
Quantity made in Government Farm	..	..		2,519 15
Quantity made in Demonstration Centres		..		2,808 10

APPENDIX VIII.

APPENDIX VIII.

List of Sugar Factories in the Northern Circle, 1939-40.

Serial No.	Name of district.	Name of factories with owners.	Description of the plant and its capacity.	Outturn.	Remarks.
1	2	3	4	5	6
1	Rajshahi Sedar	Lakshmi Sugar Mills, Babu Mohini Mohan Ray Choudhury, Shapura, Rajshahi.	1. Engine 35 N.H.P. Steamed. 2. (a) Crusher, 2—192. Chattanooga extraction 58-60 per cent. Capacity 25 maunds. (b) Crusher, 2 Burn & Co., 18"×12" Riller. Extraction 59-60 per cent. Capacity 30 maunds. (c) Crusher, 4 Peterson, Renwick & Co., 9"×6" Riller. Extraction 60 per cent. Capacity 20 maunds. 3. Furnace 9, Rohilkhand (working in six furnaces). Output 1½ maunds to 2 maunds. 4. Centrifugal, Pott Cassels 30"—4—Recovery— 1st Sugar 37—20 per cent. Price at Rs. 10 to Rs. 10-8 per maund. Cane at 7 as. per maund.		
2	Ditto	The North Bengal Sugar Mills Company, Limited, Gopalpur (Rajshahi).	Fawcett Peston 1,000 tons capacity double Sulphitation plant.	Average outturn per day about 1,000 maunds sugar.	
3	Ditto	The Naogaon Co-operative Agricultural Association, Limited, Sugar Factory, Naogaon, Rajshahi.	Complete departmental plant. (300 maunds daily) 18—21 Crude Oil Engine. One pott Cassels Williams' Sugar Centrifugal Machine.	Not in working condition.	

4	Ditto	Setabganj Sugar Mills, Limited, Managing Agents—Surajmali Nagarmall and Company, 61, Harrison Road, Calcutta.	Departmental Type of Open Pan Sugar Factory with Peterson's improved K. B. Type Machinery.
5	Ditto	Shankara Pratishthan, Limited, of Biral Head Office, 4, Mission Road, Calcutta.	Departmental Type of Open Pan Sugar Factory with Peterson's K. B. Type Machinery.
6	Ditto	The Laxmi Sugar Mills, Limited, Head Office—Birampur. Owner—Rai Sahib J. Saha, P. O. Birampur (Dinaipur).	Open Pan Khandesari one ton capacity.
7	Ditto	Sengupta Sugar Mill. Owner—Satindra Nath Sen Gupta.	Open Pan Sugar Mill.
8	Ditto	Kaharol Sugar Mill of Tilakchand Jitmall of Dinaipur.	Open Pan Sugar Mill. Owner—Gangaram Agarwallah, a Marwari merchant.
9	Ditto	Gangaram Rice and Sugar Mill	60 B.H.P. Oil Engine, 1½ tons capacity—Peterson's K. B. Type crusher, Peterson's furnace, Kumardhubi Aerator, K. B. Type. Pug Mills and 24" K. B. Type Centrifugal.
10	Jalpaiguri	Khandeswari Sugar Mills, Hos-sainabad, P. O. Birpara (Jalpaiguri), Hon'ble Nawab Musharruf Hossain (Khan Bahadur), Minister.	Messrs. Blairs, Limited, and George Fletcher's Double Sulphitation plants. Capacity 750 tons 14 qrs.
11	Ditto	Shikarpur Sugar Mills, P. O. Belakoba (Jalpaiguri), Mr. F. Marshland.	

APPENDIX VIII—concl'd.

Serial No.	Name of district.	Name of factories with owners.	Description of the plant and its capacity.	Outturn.	Remarks.
1	2	3	4	5	6
12	Jalpaiguri Sedar	Altadangi Sugar Estate, P. O. Ramshai Hat (Jalpaiguri), Mr. F. Marshalland.	11 H. P. Marshall's Boller and Engine, Jessop 2 tons crusher Peterson's Plant Furnace.		
13	Malda	Malda Co-operative Sugar Mills, Limited, Panchanandapur, Malda.	<ol style="list-style-type: none"> 1. Peter Oil Engine, 18—21 B.H.P. 2. Peterson's Crusher. 3. Centrifugal—Pott Cassells—Improved K. B. Type 24" × 14." 4. Perator Grainer (Peterson's plant). 5. Pug Mill. 6. Gur Boiling Furnace (Peterson's improved type). 7. Crushing power—350 maunds cane a day. Productive power—15 maunds sugar a day. 	Quantity of gur 677 maunds 7½ seers. Sugar 257 maunds 12 seers 10ch. Worked from 26th November to 18th January.	
14	Ditto	Mathurapur Sugar Mills. Owner—Babu Bahadur Singh Singh—Zeminder. Mathurapur, Malda.	<ol style="list-style-type: none"> (a) Crossby Brothers' Crude Oil Engine, 20½ H.P. (b) Kiroscar Crusher. (c) Centrifugal—Pott Cassells—Improved K. B. Type. (d) Aerator Grainer (Kiroscar's plant). (e) Pug Mill. (f) Gur boiling furnace. (g) Crushing Power—250 maunds of cane a day. (h) Productive Power—12 maunds sugar a day. 		

15	Rangpur	Messrs. A. Pandit and Brothers, Rangpur.	<ol style="list-style-type: none"> 1. Improved Peterson Renwick Cane Crusher. 2. A. T. R. Gur Furnace by Messrs. Renwick and Company. 3. 14 B.H.P. Black Stone Crude Oil Engine (hardy Type). 4. 30" Pott Cassels William Centrifugal.
16	Ditto	Manager, Bagda Farm, Limited, P. O. Gobindaganj (Rangpur).	<ol style="list-style-type: none"> 1. Roller—Messi Clark Crusher. 2. Roller—Challenge Crusher. 3. One 36" Centrifugal. 4. One 18" Centrifugal. 5. One Pug Mill. 6. 2 Bells for making Rub-mixed Bhupal and Rohilekhand.

Annual Report of the Live-Stock Expert, Bengal, for the year 1939-40.

Charge.—I held charge of the office during the year, Babu N. N. Sur, I.N.D., was in charge of the Poultry Section, Babu S. Sen, in charge of the Cattle Breeding Section, and Mr. C. C. Dean, N.D.D., Dairy Instructor, in charge of the Dairy School.

District Staff.—The sanctioned District Staff is nineteen Live Stock Officers (including five for Poultry Multiplication Centres), twenty-six Assistant Live-Stock Officers and forty Stockmen. The actual strength at the close of the year was fourteen Live-Stock Officers, eighteen Assistant Live-Stock Officers and forty Stockmen. This staff have to inspect over 2,750 stud bulls, tattoo progeny, check service report, encourage the growing of fodders, inspection of Poultry Demonstration Centres and advise same. Unfortunately with the provincialisation of the Veterinary Staff, much of my officer's time has been taken up in attending to bulls reported to be sick, or really doing the work of the Veterinary Assistant Surgeon, instead of Animal Husbandry. In addition they have to lecture at meetings of Rural Reconstruction, Welfare Units, Durbars and with the Cinema parties when in their districts.

Tours.—I was on tour for 129 days, the Live-Stock Officers and Assistant Live-Stock Officers toured for 4,916 days during the year. Stockmen have fixed headquarters which are changed as necessity demands. Touring of some of the Live-Stock Officers had to be curtailed due to lack of funds and eleven Assistant Live-Stock Officers were under training at Dacca for 10 months which reduced the days they would have been in the districts.

Intensive touring by officers is in my opinion necessary for the present to keep the scheme moving, in the way of instructing cattle owners to take every advantage of the stud bulls and grow more fodder crops.

Work.—During the year, 5 Live-Stock Officers were appointed in the districts and one for the Poultry Multiplication Centre, Narayan-ganj. Three hundred bulls were supplied to the districts of Jalpaiguri, Bankura, Nadia, Dacca, Comilla, Mymensingh, Murshidabad, Howrah, Pabna, Dinajpur, Bogra, Faridpur, Midnapore, Bakarganj, Hooghly, Malda, Rajshahi, Khulna, and 24-Parganas, from provincial funds, and twenty-seven for Khas Mahal and other parties. In addition seventeen young bulls were issued from the Cattle Breeding Section, Dacca Farm. It is pleasing to be able to state that the work of the Section has again increased. There are Cattle Improvement Scheme in 22 districts and Poultry Demonstration in 26 districts. The work is handicapped due to inadequate clerical staff and shortage of Assistant Live-Stock Officers also to the fact that no Assistant Live-Stock Expert has yet been appointed.

The Section continues to deal with all Animal Husbandry subjects and the teaching of the same. The latter is done at Dacca. A good deal of interest is being taken in Cattle and Poultry Improvement where the schemes are working, and many requests are received for short course training which unfortunately cannot be granted as yet.

The Annual Reports of this Section for 1937-48, 1938-39 stated how the Cattle Improvement Scheme was launched, since then three hundred bulls have been purchased by Government.

Every caretaker of a bull maintains a Register in which all services, sickness, etc., are recorded, these are checked by officers during tours. These records show that approximately 68,966 cows were covered during the year against 56,477 for the year 1938-39. An additional 50 per cent. can be added for cows covered in fields for which no records are maintained. Fortunately fewer bulls were transferred from one caretaker to another during the year. Officers numbered 54,125 progeny of Government bulls against 25,270 in 1938-39. Tattooing enables officers to check progeny and the same is appreciated by the owners. Such stock are fetching better prices in the local market.

During the year officers castrated 52,482 scrub bulls against 30,270 in 1938-39. This number will increase when all officers are fully equipped. Officers attended Exhibitions, Cattle shows, Welfare Units in the districts and gave over 220 lectures.

There is now a good deal of interest taken in stud bulls and their progeny since the latter have been born. Large crowds attend cattle shows to see the stock, where the scheme has been working since 1937-'8. It is common for the owner of progeny to refuse Rs. 35 and 50 for a year old calf. Breeders are convinced that better stock can be bred and reared. Still, more fodder has to be produced to rear really good stock, but many cultivators are doing so and there is every hope others will follow.

Fodders.—The growing of fodder crops is being pushed. From a special grant by Government over 520 maunds of fodder seeds have been issued during the year. Reports show that there is an increase of fodder growing in most districts.

The solution of better cattle in the Province is better breeding, more fodder and better care of the straw produced; not pasture or more cattle.

Silage.—Eighty-three silage pits were made against 26 in 1938-39, these do not include silage made by other officers. This it will be seen is extending, but slowly. The question of the better utilisation of water grasses is being studied.

Bulls brought from the Punjab in October 1938 are being maintained in excellent condition in Barisal district. This again proves that the climate has little to do with the health of the stock of Bengal.

Reports from 19 districts—in which the owners of 12,355 cows were questioned—show that the average milk yield in a lactation was between 250—300 seers, with a dry period of 150 days. I consider the estimate for milk yield too high and that for dry period too low.

Poultry.—Once again poultry and eggs had to be purchased to meet the demands in the districts. There are Poultry Demonstration Centres in every district except Darjeeling and the Chittagong Hill Tracts. During the year 501 cockerels and 389 dozen eggs were issued to villagers.

Good progress with these centres have been made in all districts. The producers of better fowls and larger eggs obtain much higher prices than for the local bird and eggs.

The scheme for a Poultry Multiplication Centre in each division has been arranged for, one is working in Dacca Division others will be working within a few weeks. Contagious disease continues to take a very heavy toll of all classes of poultry in villages.

Goats.—The scheme for experimental work on goat by breeding pure and crossing with bucks from other Provinces is under the consideration of Government. I am of the opinion that until some work is done on crossing by Government, the same should not be encouraged.

The District Boards of Dacca, Faridpur, Mymensingh, Rajshahi, Berhampore, Nadia, Hooghly, Bankura, Comilla, Pabna, Bogra, gave grants for assisting stock improvement in their districts.

Cattle Improvement.—The grant of Rs. 7,200 as awards to caretakers of stud bulls was continued. This is a great encouragement in all districts. For Cattle shows some District Boards supply funds for prizes to young stock, at centres where bulls have been placed.

Great improvement is to be seen in the young stock of the districts of Berhampore, Faridpur, Dacca, Malda, Rajshahi and Tippera. It was in these districts that the scheme started in 1936-37. Males are now being distributed.

The question of treatment of Government stud bulls has become more serious. It is understood that the matter is under the consideration of Government. All officers are supplied with sets of lantern slides, on fodder, cattle and poultry. A good series of coloured posters in addition to leaflets have been supplied for propaganda. In my opinion a whole-time officer is necessary to teach officers better methods of propaganda.

Most officers are now equipped with tattooing sets and castrators. The former method is popular and few object to castration by the Burdizzo.

The present staff is mentioned on page 1 of this report.

Dacca Cattle Breeding Section.—The report is appended.

Herd.—In future only pure Harriana cows and Murrah buffaloes will be maintained. The cross bred Harriana will gradually crop out. The Scindi herd has been disposed of.

Disease.—General health of the stock was good. Towards the latter part of the year, septicemia in newly-born calves caused a number of deaths and is still giving trouble.

There was a very serious outbreak of piraplasmosis in the newly-purchased cows, repeated injections of Trypan blue did not cure the disease. This and the course of hump sore is being investigated by officers of the Civil Veterinary Department.

Poultry Section, Dacca.—The report of this section is appended. Fortunately there has not been any serious outbreak of disease amongst the adult flock.

Crossing between the R. I. R. and Chittagong will cease from 1st April. Selection will now be done for egg laying, size and colour.

Dacca Dairy School.—The school is very well equipped for teaching dairying, in all its branches, being in fact a Model Dairy complete with its own herd and all facilities for teaching.

Eleven Assistant Live-Stock Officers were withdrawn from the districts and given 10 months' training in Animal Husbandry and Dairying.

The school will form a part of the Agriculture Institute when the latter opens. It is to be hoped that short courses in Dairying and Animal Husbandry will be continued.

Work for next year.—There is still a hope that the scheme drawn up for the districts of Jessore and Rangpur will be accepted by the Commissioners to bring all districts into a uniform system of stock improvement. The scheme submitted for Darjeeling district is being reconsidered.

When the cadre of Assistant Live-Stock Officer is up to full strength, a further class of Assistant Live-Stock Officer will be given training at Dacca.

One hundred bulls will be distributed free in certain districts.

Poultry Demonstration will again be given in selected villages, especially where those have failed through disease. Demonstration in improved Dairying methods suitable for villages in Bengal will be given.

Conclusion.—From my tours, interviews with District Officers and from the Annual Reports of officers there cannot be a doubt that the Cattle and Poultry Improvement Schemes are a success.

Reports from many districts show that owners of one year old calves, being the progeny of Government stud bulls receive from Rs. 35 to Rs. 50 each and such prices are often refused. This is against Rs. 5 to Rs. 10 for local stock. The female progeny of the stud bulls issued in the early part of the scheme yield from 6 to 8 seers of milk a day.

There is a definite demand for more stud bulls in every district where the scheme is working. At Cattle shows held in the district of Murshidabad the total progeny of Government bulls shown was 838 against 952 of other classes. In many cases a six-month old calf was as big as its mother.

More fodder is being grown in most of the districts. Owners of progeny of Government stud bulls are taking better care of them.

Ghee and Channa Centres are being established in villages where Government bulls are being used.

Poultry.—In every district there is a great demand for improved breeds of poultry and where villages have been well selected there has been success. Disease has in more than one case cleared a whole village out, still there is a demand. Private parties are purchasing improved breeds of poultry on our advice.

To enable the scheme to fulfil the purpose it was started for, it is essential that the district staff be kept up to full strength, also that Live-Stock Officers and their Assistants are not turned into office clerks. The latter is now happening.

Acknowledgments.—Thanks are due to Major I. Stewart, I.A., Deputy Commissioner, Jalpaiguri, and to several District Magistrates also Chairmen of District Boards who have interested themselves and assisted in the work of the Section.

My thanks are due to my office staff, which is much under strength for their hard work.

Babu N. N. Sur, I.D.D., Poultry Officer, Dacca, has done very good work and was of great assistance in arranging for the Poultry Multiplication Centres.

Most of the officers in the districts work well often under trying conditions. The following are mentioned:—

Babu B. N. Sen, B.Sc., I.D.D., Live-Stock Officer, Berhampore-Nadia.

Babu B. K. Gupta, G.B.V.C., Live-Stock Officer, Hooghly-Bankura.

Maulvi S. Ahmed, G.B.V.C., Live-Stock Officer, Jalpaiguri.

F. J. GOSSIP,

Live-Stock Expert, Bengal.

Annual Report of the Cattle Breeding Section, Dacca Farm, for the year 1939-40.

Charge.—Babu Sailendu Sen was in charge of this Section throughout the year and was assisted by Babu C. M. Das, I.D.D., and Maulvi Mohammad Ali Sardar.

Policy of the Section.—The policy of the Section remained unchanged and the resolution passed by the Cattle Breeding Committee is being followed. The herd now consists of pure bred Harriana and crosses between Harriana and Bengal Cattle and a small herd of Murrah Buffaloes. It was decided to discontinue the pure Scindi herd at the Cattle Breeding Section, Dacca Farm, and the cows and heifers was sold by public auction while the bulls and bull calves were distributed free.

Thirty-two cows were purchased from Rohtak for the New Dairy School. The Section aims at Cattle Breeding, the improvement of stock and supply of bulls to districts and teaching of dairying.

Distribution of bulls.—Seventeen bulls have been distributed during the year.

Disease and casualties.—The general health of the stock was good throughout the year. Septicaemia in new-born calves has been the cause of a number of deaths. Cattle were inoculated against rinderpest by Goat Virus method.

Considerable investigation has been made by the Disease Investigation Officer of the Civil Veterinary Department for the eradication of humpsore which is common in the herd. Red Water broke out in the imported pure bred Harriana cows and the disease was partly checked by the prompt action taken by the Officers of this Department and the Civil Veterinary Department.

Manure and Artificial Farm Yard Manure.—About 8,000 maunds of cowdung and 1,200 maunds of artificial manure have been made and supplied to different sections of the farm during the year.

Receipt and Expenditure.—The expenditure (excluding stock transfer) was Rs. 27,385-8-3 and receipts (excluding stock transfer) Rs. 6,958-9 have been credited as sale-proceeds.

Visits.—His Excellency the Governor of Bengal visited the farm, once during the year under report. The Hon'ble Minister of Agriculture, Hon'ble Minister in charge, Communications and Works Department, and the Hon'ble Minister in charge of Legislative and Judicial, Raja of Lalghar (Midnapore), and the Director, Imperial Institute of Veterinary Research, Muktesar, visited this Section and showed much interest. The Revenue Minister and the Director of Agriculture, Tripura State, also visited the Section once during the year.

Deaths and Causes :—

	No.
Septicæmia	7
White Scour	5
Tympanitis	4
Enteritis	2
Diarrhoea	3
High fever	1
Impaction	2
Red Water	4
Total ..	28

Distribution of bulls :—

Plungdung Co-operative Milk Society, Darjeeling	1
Live-Stock Officer, Murshidabad ..	16
Total ..	17

Average milk yield of different herds during the year 1939-40 :—

	Lbs.
1. Harriana	8.5
2. Harriana cross	8.00
3. Murrah Buffalo	10.2

*Strength of the herd as it stood on the 1st April 1940.**Harriana—*

Cows	38
Bulls	3
Male calves	13
Female calves	27
	81

Harriana cross—

Cows	19
Male calves	14
Female calves	20
	53

Murrah Buffaloes—

Cows	13
Bull	1
Male calves	4
Female calves	11
	29

Scindi—

Bull	1
Male calf	1
	2

Nutrition Bullocks

.. .. .	9
Total ..	174

Classification of cows according to best yield in a lactation.

				Lbs.
Chapa ..	..	..	..	5,683
Chandra ..	..	..	..	4,956
Sudha ..	..	..	..	4,857
Maya ..	..	..	..	4,366
Saraju ..	..	..	..	4,264
Lucy ..	..	..	..	4,028
Fulmani ..	..	..	..	3,861
Chaya ..	..	..	..	3,814
Jamuna ..	..	..	..	3,802
Smrity ..	..	..	..	3,792
Pramila ..	..	..	..	3,499
Nirupama ..	..	..	..	3,427

Annual Report of Poultry Section, Dacca Farm, for the year 1939-40.

Babu N. N. Sur, I.D.D., remained in charge of the Section throughout the year under report.

The health of the stock was good except for an outbreak of *Coccidiosis*, which broke out in the month of May in the pens of the 4 to 5 months' age group, and spread among other stock except the Chittagong flock. Younger chicks were found to die without any apparent signs of disease and some were found to void blood. Post-mortem showed that the caecum and the intestines were full of blood and sometimes they appeared charred. No remedy was found for the disease and the virulence gradually subsided as rains set in.

At the close of the year the stock consisted of 50 cocks, 293 hens, 18 cockerels, 15 pullets, 549 chickens, 7 deshi hens, 9 Khaki Campbell ducks, 5 cross drakes, 11 cross ducklings, 4 deshi ducks, 8 geese, 9 pigeons, 6 turkeys—total 1,006. Of these 314 birds, 727 eggs were purchased for the Poultry Multiplication Centres.

A comparative study of the different breeds and crosses have been tabulated.

From the table it appears that no further improvement is possible in the crosses—by way of laying. The crosses are now too numerous to keep a complete and detailed account and it is not considered necessary to carry on any further crossing. The crosses—whatever they are now may be called "Dacca breed". As a definite breed—they have a conformation and type and breed true except for colour.

During the year 7,260 eggs were laid, out of which 1,793 were sold for hatching, 831 issued free for hatching, 2,489 sold for table, and 2,147 eggs were set for hatching or experimental purposes. 57 birds were sold for breeding and 267 birds were sent to the Poultry Multiplication Centre at Narayanganj.

Gola pigeons are kept to study the utility point of view of bantams or smaller birds and it is too early to make any conclusive remarks about either pigeons or geese.

When all the 5 different Poultry Multiplication Centres start there will be no difficulty of supplying hatching eggs or cockerels to different districts.

The Poultry Officer had to tour in connection with the selection of land and lay-out of different Poultry Centres.

Comparative yield of eggs of different breeds.

Year.	R. I. B.	Chitta- gong.	1st cross.	2nd cross.	3rd cross.	4th cross.	5th cross.	6th cross.	Deshi hen.	1st cross. (Deshi hen and 5th cross cock.)	Khaki Campbell ducks.	1st cross Khaki Campbell.	Deshi ducks.	Geese.
1927-28	52	60	..	..	..	..	..	..	..	..	..	..	..	..
1928-29	48	63	65	..	..	..	..	..	..	..	..	..	..	..
1929-30	50	86	68	54	..	..	..	..	..	..	..	..	..	..
1930-31	98	84	76	75	..	..	..	..	..	..	..	..	..	..
1931-32	72	86	77	66	72	..	..	..	..	..	..	..	..	..
1932-33	84	92	90	87	95	108	..	..	..	..	..	..	..	..
1933-34	136.6	95.2	110.4	7.4	99.8	110.5	..	..	..	..	..	..	..	..
1934-35	141	95	124	122	123	107	99	..	..	..	..	..	..	..
1935-36	144.3	110	158	112.8	125.3	99.9	124.4	120	44	..	..	..	..	..
1936-37	132	105	140	130	126	95	120	109	50	..	..	..	..	..
1937-38	140.6	106.9	142.5	126.6	125.5	114.3	112.2	99	57.3	61	149	..	..	..
1938-39	136	94	134	137	123	96	86	99	46	65	122	..	..	..
1939-40	135	97	136	131	118	99	92	101	47	66	123	102	72	12

**Annual Report of the Agricultural Engineer to the Government of
Bengal for the year 1939-40.**

Charge.—I held charge of the office of the Agricultural Engineer to the Government of Bengal for the full period under review.

Tours.—I was on tour in the Province for 87 days during the year and visited almost all the districts of Bengal.

Staff.—The work of this Section was conducted with the assistance of the same staff plus an additional draftsman and tracer engaged from October 1939. The staff now consists of Babu K. B. Roy as Overseer, Babu S. N. Banerjee and Babu Chandra Chur Choudhuri as Draftsmen, Babu A. L. Chowdhury as Foreman, Babu B. B. Sen Gupta as clerk and Maulvi Md. Badrul Alam as Tracer.

New machinery invented and designed.—(a) A third type of large steel trolley for portable irrigation plants, to take engines up to 20 B.H.P. and 10-inch pumps was designed and one of these made up by a local firm for a private irrigation scheme in the Malda district. This type of portable irrigation plant will in the future be employed both on Government irrigation schemes as also for irrigation schemes for the public. A plant of this type reduces irrigation costs to the minimum and is very profitable especially when cheap crops such as aman paddy are concerned which require large volumes of water for irrigation and sells at Rs. 2 and less per maund.

(b) A Power Driven Flax Breaking Machine intended for the Provincial Flax growing scheme, has been designed but none have yet been made up, as we are not yet aware of the details of this scheme which has to be definitely decided very soon.

The following improved machines of my design were sold during the year:—

	No.	
"A" type Double Pan Gur Furnace	1
"D" type Single Pan Gur Furnace	1
Portable Irrigation Trolley	1

New implements invented and made.—Five new types of light ploughs were designed and made up, four of which are metal and the fifth of wood. These are excellent ploughs, not only light in weight but also very light in draft, they weigh all complete from 10 seers to 13 seers, the wooden one being the heaviest. The smallest pairs of Bengalee bullocks available have been yoked to these ploughs for test and they draw them with ease. They plough down to a depth of 4 inches in laterite soils and 5 inches in alluvial, they invert the furrows very well and completely plough up the area in one ploughing, this is equal to four or five ploughings with the Deshi plough. They are sold complete with hardwood draftpole and handle and are very economical to purchase. They possess the life of many Deshi ploughs and worn parts can be replaced for a few annas. The ploughs are described below. There are no bolts and nuts in any of these ploughs.

A. Type "A" Light Metal Plough, in three pieces, body, mould-board and share, all in cast iron, with hardwood pole and handle. The

mouldboard and share can be replaced when worn away at the cost of a few annas. Rupees 6-12 each, complete. Weight 12 seers.

B. Type "D" Light Metal Plough, in three pieces, body, mouldboard and share. The body and mouldboard are of steel and the share of cast iron, Mouldboard and share replaceable as before when worn away. Total weight 11 seers. Rupees 9 each, complete.

C. Type "B" Light Metal Plough, in three pieces, body, mouldboard and share. The share and body are of cast iron and mouldboard of steel, share and mouldboard replaceable as before at the cost of a few annas each. Total weight 12 seers 2 chittacks. Rupees 6-12 each, complete.

D. Type "C" Light Metal Plough, all cast iron in two parts, body and mouldboard in one part and share separate. Share can be replaced when worn for a few annas. Total weight 11 seers 12 chittacks. Rupees 6-4 each, complete.

E. Wooden Plough, type "*Dacca*". The whole body of the plough is made in hardwood and all portions likely to wear or crack are reinforced with steel. The mouldboard and share as also all other steel parts of this plough can be replaced at the cost of a few annas each, many parts of this plough, in fact the whole plough except share of phal can be made up in the villages by a good carpenter and blacksmith. Weight 13 seers 7 chittacks. Rupees 5-8 each, complete.

F. Two types of Bidas, a standard and light, were designed and made up. These implements are meant to break up the film forming on the surface of paddy and wheat lands after sowing; they also do the work of a light cultivator in opening up the surface of sown fields for aeration of the soil and remove weeds. They do excellent work and cost for the standard type Rs. 14-8 each and light type Rs. 13-12 each.

G. An all steel moi was designed and made up, this implement is intended to do the same work as is done by the wooden or bamboo moi or ladder, but to do it better and quicker and will outlast several ordinary mois. These cost Rs. 18 each

H. A pea-nut and potato lifter was designed and made up, this implement has not been tested out yet, it is intended for lifting peanuts and potatoes and other similar crops out of the soil without damage and expeditiously. It will be drawn by a pair of bullocks and will be cheap to purchase.

Departmental improved implements sold during the year:—

	Nos.*
"Bengal" No. 2 ploughs	103
"Sobkam" No. A ploughs	4
"Sobkam" No. 1 ploughs	114
"Sobkam" No. 2 ploughs	222
"Bangla" plough	1
"Pahari" plough	4
"Amir" plough	6
Wooden plough " <i>Dacca</i> "	50
Handhoes "A" type	88
Handhoes "B" type	78
Bida No. 2	1
Steel ladder	1

Asbestos Cement Irrigation Valves—

12"	..	..	..	..	37
9"	..	..	..	..	2
6"	..	..	..	..	28

New buildings designed.—

1. Standard type cowshed for departmental and public farms and dairies, for 30 pairs of cattle.
2. Chaffing shed for the agricultural farm at Maslandpur.
3. Engine and pump shed for irrigation on the agricultural farm at Maslandpur.
4. Proposed Mycological and Entomological Laboratory.
5. Elevation with trusses for main span and leantoos of standard departmental type open pan 1,200 maunds or 50 ton sugar factory.
6. Standard type bullock shed for department and public farms.
7. Elevation of factory buildings of standard departmental type open pan 1,200 maunds sugar factory.
8. Lay-out plan of 1,200 maunds standard departmental type open pan sugar factory No. 2.
9. Details of line and counter-shafting for standard departmental type open pan 1,200 maunds sugar factory.
10. Lay-out plan showing juice and water pipes for standard departmental type open pan 1,200 maunds sugar factory.
11. Proposed garage attached to the godown of the Jute Committee.
12. Plan of a cowshed with calf-pen and godown on either side for Widows' Home, Midnapore.
13. Proposed combined office building for the Agricultural Engineer, Bengal, and the Chief Superintendent, Dacca Farm.
14. Standard drawing showing silo pit above ground level.
15. Standard drawing showing silo pit below ground level.
16. Improved covered threshing floor.
17. Plan of manure shed at Dairy Farm to be converted into Live-Stock Expert's office.
18. Round shaped paddy seed gola for Chittagong.
19. Lay-out plan of fowl and chicken runs for District Poultry Centres.
20. Incubator room and godown for District Poultry centres.
21. Standard drawing for fowl run servants' quarters.
22. Silo pit for Gopalpur.
23. Proposed tobacco fermentation godown, Dacca Farm.
24. Bull shed for one bull.
25. Standard cooly quarters for farms.
26. A Model of Staff for Animal Nutrition Section Sheet Nos. 1 and 2.
27. Lay-out plan of fowl and chicken runs for Jamalganj.
28. Lay-out plan of fowl and chicken runs for Ranaghat.
29. Lay-out plan of fowl and chicken runs for Midnapore.

New buildings constructed.—

1. Poultry Multiplication Centre at Narayanganj—
 - (a) Incubator and godown, office and godown building.
 - (b) Fowl and chicken runs.
 - (c) Menials' quarters.
2. Tobacco fermentation godown at Dacca Farm.
3. Standard type cooly quarters at Dacca Farm.
4. Masonry culverts at Chinsurah Farm.
5. Quarters for driver and mate at Chinsurah Farm.

All new types of buildings designed last year for farms, such as godowns, seed godowns with ventilated masonry bins, manure pits, silos, above and below ground level, covered threshing floors, cow and bullocks' sheds, etc., have and are being constructed on new farms throughout Bengal.

Surveys.—Several surveys, large and small, for protection works, drainage, irrigation and reclamation were carried out this year in several districts of Bengal under my instructions and supervision.

Reclamation.—A large project consisting of 16 square miles in the Bakarganj district for the reclamation of the Salta Bheel Area is at present in hand under my supervision.

Irrigation, drainage and protection.—Three fairly large works in the Nadia and Rajshahi districts consisting of Dikas for protection of crops against flooding, drainage of these diked areas and irrigation of crops within the protected areas were taken in hand at the end of last year, two were completed before the rains commenced this year and the third which was commenced this year is still in hand. The results obtained from the two completed areas have been excellent and beyond my expectations. On the first two areas before they were taken in hand, crops of sugarcane averaging only some 150 maunds per acre could be raised, this year the average was well over 1,000 maunds per acre. The owners of these lands were at first very diffident in financing my scheme, they considered it would be a waste of money, because, schemes recommended by others and which they carried out had proved quite unsatisfactory. The results of my scheme however has not only repaid the total expenditure in one year, but over and above this has paid a very good profit, so they now intend adopting the scheme on all their lands.

Land Improvement Schemes.—My experiment carried out last year and intended to be continued over several years, for the improvement of the lands in the Sunderbans Colonisation Area of the Bakarganj district, was not a success this year due to want of proper supervision on the part of the authorities at site, the protecting bunds were breached and the area was submerged by sea water. The previous year it was a great success and if the experiment had been continued year after year, the land would gradually have regained its original fertility. The soil has now deteriorated to the condition it was in before the experiment was commenced and it will have to be again taken in hand and a fresh start made.

Irrigation schemes.—Estimates and plans for several proposed irrigation schemes have been submitted, one of which is in operation and two are under construction. It is not certain if the others will be sanctioned in the near future, because of the war.

Drawing and estimates for irrigation drainage and water-supply schemes.—All drawings listed below and their estimates have been prepared and submitted:—

1. Engine and pump shed for irrigation on the Agricultural Farm at Maslandpur.
2. Lay-out plan for the irrigation of Babu Iswar Lal Ghosh's land at Malda.
3. Lay-out plan of a portable irrigation plant for Mainaguri.
4. Lay-out plan of a portable irrigation plant for Falakata.
5. Revenue Thana Mainaguri from side cuttings.
6. Revenue Thana Falakata from side cuttings.
7. Sketch showing the construction of 9 inch tube-well at Dacca Farm.
8. Syphon for Chinsurah Agricultural Farm.
9. Arrangement for carrying water by flumes and pipes across the road at Chinsurah.
10. Level section and culvert for Malda approach road 7,200 feet.
11. Shed over tube-well and pump.
12. Masonry "V" Notch Weir.
13. Covered masonry tank for 12,000 gallons.
14. Small tube-well installation for self-priming pump.
15. Shed for small electric pumping installation.
16. Level section with the formation level of the irrigation channel for irrigating flax and linseed.
17. A cadastral survey map of Rajshahi Farm.
18. Correction of lay-out plan for a portable irrigation plant.
19. Wooden beams under irrigation plant carriage for Pochagarh.
20. Irrigation scheme for deep water paddy experiment at Dacca Farm.
21. A contour survey map of Salta Bheel.
22. Scheme for the improvement of Salta Bheel Area.
23. Arrangement of irrigation and drinking water-supply from the proposed 6 inch tube-well in the Institute area.
24. Drainage plant block "A" for Manikdihi at Ramnugger—sheet No. 1.
25. Drainage plant block "A" for Manikdihi at Ramnugger—Sheet No. 2.
26. Drainage plant block "A" for Manikdihi at Ramnugger—Sheet No. 3.
27. Pit for tube-well and pump pit with shed for Engineering Workshop at Dacca Farm.

Other civil and mechanical drawings.—In addition to the drawings and estimates listed before, a further large number of both civil and mechanical drawings with the usual estimates for various types of work have been prepared and submitted. The majority of these drawings are of original design.

Sugar and gur factories of the open pan departmental type.—Our departmental open pan sugar and gur factories which have been operating in several districts of Bengal and in other Provinces this year, have done extremely well.

It was our intention to put the open pan system on a level with the vacuum pan, because, many eminent people in sugar considered that this was an impossibility and also because we wished to open out this industry to the small Bengalee capitalists. We therefore first studied the different types and make of machinery employed on the manufacture of sugar by the open pan system and found all the machines inspected at work to be inefficient, uneconomical and many not suited for the class of work they were employed on. Besides, a number of operations in the process of manufacture were being carried out by manual labour when power was available and to spare. Again there was too much handling of the juice, syrup, rab and sugar, instead of this being automatic. All this tended to make the manufacture of sugar expensive and the sugar so manufactured was seldom or ever uniform in grade, colour and percentage. We accordingly designed, made up in India and tested out a complete set of machines for open pan factories of difference sizes, which would be very efficient, inexpensive, sturdy and do away with manual labour altogether, making the whole process automatic, economical and power driven. This we have finally accomplished to our satisfaction, and factories of this type can now be erected from 25 to 100 tons of cane per day, the larger the more profitable.

After having corrected and put on the market satisfactory machinery for this type of factory, we set about improving the processes of manufacture and by trial and error we eventually arrived at what is considered the maximum efficiency and quality of sugar this type of factory is capable of producing. We can obtain an average percentage of sugar on cane of 8 per cent. and further there is no loss in molasses, because, we convert by a certain process all molasses into a good quality gur which is called second gur, because it is not manufactured direct from juice. This gur has been sold for the past three seasons in Bengal for fairly good prices. It can therefore be easily seen from the above description that, as there is no loss whatsoever, these factories work out financially a very sound proposition.

The sugar manufactured in them sell at the same price as the vacuum pan, often better, there is a good demand, seldom or ever are there any stocks in the godowns, all these factories now working sell their sugar practically as soon as manufactured, the gur takes longer to sell. When the price of gur is high these factories manufacture only gur, as was done last year, but when the price of sugar is high both sugar and gur are manufactured, the latter as mentioned before from the molasses available.

Sugar can be produced in these factories by a certain process, 3 to 4 hours only after the rab has been produced, in fact before the rab or massecuite has completely cooled down, and this sugar is of an

excellent quality but the price it is sold at is practically the same as sugar produced by other processes, occasionally at a few annas more.

People intending to erect sugar factories of our departmental type receive every possible help and advice from the department.

Agricultural workshops.—The departmental workshops have been steadily employed in the overhauls to departmental machinery and implements, in the manufacture of newly-designed machinery and implements and furniture; the work done being too numerous to list in this report.

Enquiries and advice.—Enquiries this year for open pan sugar factories and gur plants have not been as many as in some previous years, but enquiries in connection with irrigation and agricultural implements and other matters connected with agriculture have increased considerably and all enquiries were in every case promptly dealt with and in several cases plans and estimates provided.

Advice is asked for by Government and the public in connection with the manufacture of sugar and gur, irrigation plants, the irrigation of crops, means and sources of irrigation water-supply, tube-wells and drinking water supply schemes, improved methods of cultivation, improved machinery and implements, buildings, drainage, lay-out of farms, land reclamation and land improvement schemes and numerous other subjects relating to agriculture. These have to be individually treated and advice given as conditions differ practically in every case and a stereotyped reply would not meet the situation.

Workshop Apprentices.—This year a larger number of apprentices were enrolled than last and there were more applicants than vacancies. This was because quite a good percentage of our previous apprentices were fortunate in securing posts.

HUGH C. E. PETERSON,

Agricultural Engineer to the Government of Bengal.

Annual Report of the Dacca Farm for the year 1939-40.

1. **Area.**—The total area of the farm is 353·70 acres. The net area cultivated was 242·77 acres as shown below. The remainder, except 11·93 acres occupied by the Agricultural School, is under roads, buildings, tanks, drain, etc.

			Acres.
Experimental cultivation	...	...	122·49
Non-experimental cultivation	...	...	105·79
Cultivation on economic basis	...	...	14·49
		Total	242·77

The gross cropped area was 295·94 acres—53·17 acres having been double cropped. Besides this, 6·57 acres were under cane tests in the Institute area. The other plots which were under cultivation were abandoned with the commencement of construction of buildings, roads, etc., for the Agricultural Institute and its attached farm.

2. Rainfall and character of the season.—

Month.	Rainfall in inches.		Number of rainy days.	Number of days with rainfall over 1".	Temperature.	
	Normal.	Actual.			Maximum.	Minimum.
1939.						
April	5·49	0·28	3	..	98·6	66·2
May	8·61	5·83	9	2	91·40	68·00
June	20·67	9·82	25	3	91·40	71·6
July	22·32	30·92	28	7	86·90	77·00
August	11·55	19·11	24	3	90·00	73·4
September ..	10·49	10·21	20	4	94·00	76·0
October	5·27	13·87	13	6	92·0	70·0
November ..	1·85	..	..	..	80·0	62·0
December ..	0·35	..	..	..	86·0	54·0
1940.						
January	0·46	..	..	..	82·0	48·0
February	0·54	2·14	4	1	90·0	52·0
March	1·59	2·96	10	..	94·0	58·0
Total	89·10	95·14	136	26		

The year began with a heavy deficit in rainfall, and no field operations could be undertaken. The showers commencing from 5th May facilitated preparation of high lands and sowing of aus paddy, jute and fodder crops. The after operations were hampered by continued rains in June. Puddling of lowlands was taken up after the heavy rains (7·60 inches) on 11th and 12th July. Subsequent showers helped the completion of transplanting in time. Unprecedented rainfall

during the last week of the month (19·68 inches from 25th to 31st of which 5·93 inches and 5·90 inches were recorded on the 27th and 29th) together with 12·83 inches of rain during the first three days of August flooded the fields and gave a setback to the transplanted aman paddy. Bulk of the low-lying plots had to be replanted due to damage by total submersion of crop and to insect attack. This adverse weather condition affected the yields of fodder crops and of all varieties of aus paddy. The fields became water-logged as the drains, though running full, could not carry away the heavy accumulation of water fast enough. Aus paddy was attacked by a fungus-Helminthosporium Spp. The aman paddy crop did not generally recover from the shock even with the improvement of conditions in September. The tillering was not satisfactory. The yield was below normal as heavy rain in October interfered with the setting of grain. Jute, cotton and Arahara also suffered. Sugarcane did fairly well though water stood in the field for a week. The rainfall in October helped the preparation of land and the sowing of rabi crops; but continued drought in the following months gave no chance practically to these crops to show up. The season on the whole was not favourable. The rainfall in February and March was helpful in opening up all the high lands.

3. Establishment.—Mr. S. P. Sen Gupta, Superintendent of Agriculture, was in charge of the farm. Maulvi Md. Hossain Ali was the Farm Superintendent till 12th October 1939, when he was relieved by Maulvi Anwaruddin Ahmed, a fresh man. Four overseers, two clerks and two agricultural demonstrators were as usual attached to the farm. Babu Rabindra Kumar Shome, the Senior Overseer, officiated as District Agricultural Officer, Dacca, from 7th October to 1st November 1939 when Babu Tridib Ranjan Moulik, an Agricultural Graduate of the Allahabad University, acted in his place. Maulvi Mobarak Ali joined as Overseer on 12th February 1940 on the transfer of Babu Rabindra Kumar Shome as District Agricultural Officer, Noakhali.

4. Operations during the year.—1. The results of the experimental cultivation will be found in the reports of the Expert Officers. A brief summary of the work is noted here.

(a) *Experiments of the Agricultural Chemist, Bengal.*—(i) *Basu's plot.*—The object is to study the effect of green manure alone and in combination with lime and bonemeal in increasing the retentivity of the soil. No manures were applied this year. Maize in mixture with cowpea was sown in the kharif season. The sub-plots were ploughed in strips at intervals after the harvest to test some physical constants.

(ii) *Meggitt's plot.*—The test as in previous years was continued on Dhariyal aus paddy. Ammophos gave the highest yield and castor-cake was the next best. Gram was sown in the rabi season. The outlook is poor.

(iii) *North Mirpur Joar plot.*—The manurial test was confined to Nicifos alone as Diammophos could not be had. The manured plots yielded slightly better. Gram sown in the rabi season failed due to drought.

(iv) *West Suti G. M. plot.*—The result on Kataktara aus paddy was the same as in previous year. Green manure crops as usual were sown in October and ploughed in.

(v) *Poultry II*.—Cowdung, bonemeal and lime alone and in combination were applied and Katakara aus paddy was sown. The best yield was from plots which had received bonemeal and cowdung. Matikalai sown in October totally failed.

(vi) *Darbari high and Central Mirpur plots*.—Bonemeal and kossio-phos were tried on Katakara aus paddy. The yield was in favour of kossio-phos in both the areas. Matikalai sown in October in Central Mirpur plot. Darbari high plot was put under linseed. The crop is fair.

(vii) *West Suti and New South Hazi Block*.—51 varieties of sugarcane including 10 varieties from the Cane Station were tested under the groups—early, mid-season and late in block system. Besides these 16 varieties were tried in the museum block. The crop is being harvested.

(viii) *Manurial experiment on Sugarcane*.—Bonemeal, castor-cake alone and in combination and Nicifos were applied. The entire area was limed followed by a basal dressing of cowdung. The quantity was regulated on the basis of 36 lbs. of nitrogen and 32 lbs. of phosphoric acid.

(ix) *Cane Station*.—The study of different varieties of sugarcane, raised from seeds and cuttings and obtained from other Provinces, in relation to the demands of the factory owners and the cultivators forms the main function of this section. Of the 47 varieties under observation 20 have been rejected as not conforming to the standard. Six would be transferred for trial in the main area and the remaining 21 kept for further trial.

(x) *Paddock area*.—The study of the effect of organic manures and chemical fertilisers with and without lime on Napier grass was continued.

(xi) *North Mirartek West*.—37 varieties of tobacco have been grown for seed multiplication and test and also for leaf for cigars and "biri". The crop is not a promising one as in the previous year.

(xii) *Sunti Low*.—The question of relaying the area is still under consideration and so it was cropped without application of manure.

(b) *Experiment of the Fibre Expert, Bengal*.—As the work in connection with jute was taken up by the Indian Central Jute Committee, the experiments were confined to other fibre crops—Altissima, Rhea, Flax, Sida, Agava, etc.

(c) *Experiment of the Indian Central Jute Committee*.—(i) *S. Mirartek*.—Variety, spacing, line sowing, etc., were conducted in this area.

(ii) *S. Mostertek*.—This plot was set apart for manurial tests.

(d) *Experiment of the Economic Botanist, Bengal*.—Work on high land aus, transplanted aman and medium deep water paddy varieties was continued on pure-line, selection—especially of early ripening varieties, yield tests and hybridization. A cultural experiment on aman paddy is progressing.

(e) *Experiments of the Second Economic Botanist, Bengal*.—Work on cotton, linseed, joar, mustard, etc., was continued. An area of 300 acres in Central Mirpur was set apart for multiplication of cotton.

(f) *Experiments under the control of the Deputy Director of Agriculture, Eastern Circle*.—(i) Trials on aus and aman paddy varieties were continued as in previous years with five replications in randomised

blocks. Of the ten varieties of aus paddy Chakulia was the earliest and Solai, the latest in flowering. Kataktara gave the highest yield while Dhariāl and P × S 8 were close seconds. Nine varieties of aman paddy were tried. Ch. × Raj 22 was the first and Nagra, the last to flower. The latter gave the highest yield. The results will be found in Appendices I and II.

(ii) Berseem as a fodder crop was tried in the rabi season in collaboration with the Live-Stock Expert, Bengal. One half of the area was inoculated with the specific bacterial culture. Only one cutting was obtained. The crop shrivelled up and died in most of the sub-plots even after copious irrigation. It is proposed to carry on this work next year after a modification of the method.

(g) *Experiments of the Agricultural Engineer, Bengal.*—Plough tests were restricted to Sobkam No. 2, Bengal No. 2 and Dacca No. 1 in Sunti high land. Dhariāl aus paddy was grown. The experiment will be discontinued as corroborative results have not been obtained.

(h) *Experiments of the Agricultural Research Chemist, Dacca University.*—The work as in previous year was continued. The notes of the Research Chemist together with the results will be found in Appendix III.

II. *Non-experimental cultivation.*—(a) *Aus paddy.*—Dhariāl Charnok and P × S 8 were grown for multiplication. The highest yield per acre from individual plots was 1,476 lbs., 742 lbs. and 916 lbs., respectively. Adverse weather condition induced the attack of *Helminthosporium*. The entire stock has been treated with chemicals.

(b) *Transplanted aman paddy.*—Four varieties—Badkalamkati, Iatisail, Bhasamanik and Dudsar—were grown. The average outturn was below normal as heavy rains in October interfered with the formation of grain by washing away the pollen. The best yield from individual plots was 692 lbs., 1,982 lbs., 1,986 lbs. and 1,375 lbs. per acre, respectively.

(c) *Fodder crops.*—(i) Maize alone and in mixture with cowpea was sown in the kharif season. The average outturn per acre was 15,998 lbs. and 19,788 lbs., respectively. The highest yield of the latter from one plot worked out at 31,790 lbs. per acre.

(ii) Joar was grown in the kharif season in the jute surplus block of the rotation area which had been uniformly manured. The crop was patchy consequent on damage by heavy rains soon after sowing and a month later. The outturn per acre was 17,634 lbs.

(iii) *Napier grass.*—10·01 acres of old plantation were uprooted as the yield was found to be getting poorer and poorer. An equal area in suitable blocks was put under this crop in November. Matikalai was sown in the rabi season in the released lands which will be utilised for growing aus paddy or annual fodders as necessary in the next season. The highest yield recorded was 54,630 lbs.

(iv) *Guinea grass.*—This crop occupies 1·90 acres in odd plots. The outturn was fair.

(v) *Millet.*—Bajra as a catch crop was tried as an experimental measure in high and intermediate lands. The crop was sown with the first shower. The outturn from 0·22 acre in highland was 5,002 lbs. The crop was harvested 45 days after sowing. The crop in the intermediate land failed due it is believed to acidic condition of soil.

General Remarks.—The reduction of area of the rotation blocks, a matter in which the agreement of the Chemist was very helpful, allowed increase of acreage under fodder crops. The supply of fodder throughout the year for the farm and the dairy cattle would have been a serious problem but for the above as adverse weather affected the yield of the fodder crops generally. The quantity of silage and straw now in stock will carry us through till Napier grass gets ready with the early showers. We are, at present, at the mercy of the weather for cultivation of fodders. It is of utmost importance, therefore, to arrange for irrigation to facilitate the growing of fodder crops throughout the year to avoid suspense about adequate supply.

(d) *Groit Corpea*.—The major portion of the seed in stock was made over to the Live-Stock Expert, Bengal, for multiplication in suitable centres. The area under this crop in the farm was therefore limited to 1.75 acres. Nearly half the area was affected by drought. The crop had an attack of aphids which was brought under control by spraying kerosene emulsion. The total outturn of seed was 398 lbs. The stems, leaves and husks were fed to cattle.

(e) *Arhar*.—A selected variety of the Second Economic Botanist was grown on 0.2 acre in the kitchen garden block. The crop suffered due to waterlogging. The outturn of seed was 61 lbs.

(f) *Mustard tori No. 7* was sown on 3.75 acres. The total outturn was 674 lbs. This is not bad in consideration of the unfavourable weather.

(g) *English vegetables*.—Early strains of Cauliflower-Roy, selected Patna and Benares, Sutton's main crop Benares and Snowball were grown. "Roy" was the first to flower but the heads were rather small and of dark cream colour. Selected Benares, Sutton's main crop Benares and selected Patna did well. The former was decidedly the best. Snowball was the last to flower. Leafy growth was profuse and the heads were not satisfactory. Three varieties of peas—Duke of Albany, Sutton's Early Giant and selected Patna—were tried this year. "Duke of Albany" has maintained its reputation. "Selected Patnai" did well. Sutton's Early Giant was below standard. Tomatoes ("Perfection" and "Farm Selection") were satisfactory. There is heavy demand for the farm grown seeds. Plants of all the crops have been selected and kept for multiplication.

A consolidated statement of main crops with area, outturn, etc., will be found in Appendix IV.

5.- **Cultivation on economic basis.**—An area of 14.49 acres was put under Bhasamanik aman paddy. The crop suffered soon after transplantation by submission and about 4.00 acres had to be replanted. The financial statement has been given in Appendix V.

6. **Cultivation on Barga system.**—Nil.

7. **Distribution of seeds, manures and implements.**—The supplies from the Farm and the attached seed store have been embodied in Appendix VI.

8. **Cattle.**—One bullock died of Pyaemia following on the attack of Lymphangitis. There was an outbreak of foot and mouth disease in the herd which was successfully tackled. The general health of the

animals was otherwise satisfactory. It is proposed to replace eight old animals by purchase as soon as funds are available.

9. **Fishery.**—Nil.

10. **Practical training in agriculture.**—One young man came to the farm for training but left soon after as he considered the work too came to the farm. They were taken round to see and discuss the on the farm once a week as usual.

11. **I.C.S. officers under training.**—The officers in three batches came to the farm. They were taken round to see and discuss the different items of work and given an idea about the possibilities for improvements.

12. **Manufacture of silage.**—Green fodder of the Kharif Season surplus to requirements at that period was made into silage. The total quantity prepared was 11,93,920 lbs. (40 tons in excess of the previous year). Excellent silage has been obtained. It may be noted that the cost of handling fodder and other operations at the pit worked out at 7 annas 3 pies per ton. The loss in pucca pits as calculated up to date comes to 16·59 per cent.

At the suggestion of the Live-Stock Expert an experiment was undertaken to prepare silage in a wire-net (2" mesh) enclosure above ground. Chaffed fodder was put in after lining the side with dry joar stems. The loss was 29·61 per cent, which is due to the fact that sufficient pressure could not be exerted on the top. It is proposed to try this next year with modifications. If this succeeds the difficulty now being experienced in making gola silos will be obviated.

13. **Manufacture of artificial farm yard manure.**—All refuse, weedings, etc., were heaped up for the preparation of this manure and nearly 638,400 lbs. have been obtained up to date for use. This is exclusive of the production at the Cattle Breeding Section.

14. **Conference, exhibition, etc.**—Nil.

15. **Visits and inspections.**—The farm was visited by His Excellency the Governor of Bengal, the Hon'ble Ministers for Judicial and Legislative, Agriculture, Communications and Works, Dr. F. Minnet, Director of Imperial Research Laboratory, Mukteswar, the Revenue Minister and the Director of Agriculture, Tripura State, other Government officials and several distinguished non-official gentlemen including M.L.A.'s and M.L.C.'s. The work was appreciated. A large number of cultivators came to the farm when improved methods of cultivation, gur-making, manufacture of silage and artificial farm yard manure were explained to them. Many of them worked the implements, such as ploughs, harrows and hand-hoes with zest and expressed satisfaction at their efficiency.

S. P. SEN GUPTA,

Chief Superintendent, Dacca Farm.

APPENDIX I.

DACCA FARM.

Result of variety test of aus paddy, 1939-40. North Mirpur Grove.

Area of sub-plot—1/50th acre.

Date of sowing—20-5-1939.

Variety.	Date.		Sub-plot number.	Actual outturn.		Average outturn of paddy per acres.
	Flowering.	Harvesting.		Paddy.	Straw.	
				Lbs.	Lbs.	Lbs.
Solai	5-8-1939	7-9-1939	1	9.75	154	563.75
			14	12.30	164	
			24	12.60	174	
			34	11.00	164	
			41	9.75	147	
Panbira	5-8-1939	3-9-1939	2	10.50	111	717.75
			19	19.20	82	
			21	10.50	107	
			32	15.75	90	
			44	15.75	103	
Dhainrai	30-7-1939	29-8-1939	3	15.90	111	820.00
			12	16.40	82	
			22	19.50	107	
			39	15.90	90	
			43	14.40	103	
Puki	25-7-1939	26-8-1939	4	15.50	144	553.50
			11	10.25	98	
			25	15.50	127	
			40	8.60	82	
			48	6.50	76	
Chakulla	24-7-1939	26-8-1939	5	15.50	178	707.25
			20	13.80	133	
			29	15.60	98	
			31	10.25	90	
			46	15.50	103	
Garfa	5-8-1939	31-8-1939	6	14.10	164	676.50
			16	14.10	94	
			28	14.10	123	
			37	11.30	82	
			47	14.10	109	
P x S 8	25-7-1939	26-8-1939	7	16.90	103	820.00
			18	17.20	113	
			27	17.20	82	
			33	15.40	90	
			42	15.40	82	
Kumari	30-7-1939	31-8-1939	8	15.90	123	686.75
			15	15.90	82	
			26	17.50	103	
			36	11.60	82	
			50	8.70	62	
Pashpai	27-7-1939	29-8-1939	19	14.70	103	686.75
			17	13.10	99	
			30	14.70	103	
			35	14.70	82	
			45	12.10	92	
Katakara	25-7-1939	31-8-1939	10	27.80	164	887.65
			13	15.25	113	
			23	18.70	113	
			38	15.10	113	
			39	15.25	109	

APPENDIX II.

DACCA FARM.

Result of variety test of aman paddy, 1939-40. East Ravine.

Area of sub-plot—1/60th acre.

Date of transplanting—14-8-1939.

Variety.	Date.		Sub-plot number.	Actual outturn.		Average outturn of paddy per acres.
	Flowering.	Harvesting.		Paddy.	Straw.	
				Lbs.	Lbs.	Lbs.
Bhasamanik ..	24-10-1939	27-11-1939	1	27.70	117	1,747.00
			18	40.00	162	
			22	18.50	74	
			36	32.80	135	
			40	27.70	107	
Indrasail ..	25-10-1939	6-12-1939	2	26.70	103	1,820.40
			14	37.00	144	
			20	23.60	92	
			30	34.80	133	
			38	30.75	103	
Latisail ..	26-10-1939	24-11-1939	3	31.75	103	1,919.50
			13	24.60	92	
			27	42.00	139	
			31	34.80	127	
			42	26.60	92	
Dudsar ..	24-10-1939	20-11-1939	4	28.70	96	1,599.00
			17	20.70	127	
			21	18.50	66	
			29	31.75	115	
			44	24.60	113	
Kartiksinni ..	20-10-1939	23-11-1939	5	29.70	127	1,722.00
			12	24.60	107	
			24	28.70	107	
			28	31.75	133	
			39	28.70	100	
Malati ..	27-10-1939	8-12-1939	6	30.75	127	1,919.50
			10	35.80	139	
			26	35.80	164	
			35	31.80	133	
			41	26.70	128	
Ch × Raj (22) ..	17-10-1939	22-11-1939	7	17.40	92	1,157.00
			15	21.50	96	
			25	17.40	64	
			32	22.50	96	
			43	18.50	92	
D × I (13) ..	22-10-1939	25-11-1939	8	25.60	82	1,624.00
			11	24.60	82	
			23	24.60	90	
			33	30.75	111	
			37	30.75	107	
Nagra ..	28-10-1939	7-12-1939	9	39.00	119	2,091.00
			16	36.00	109	
			19	34.80	107	
			34	34.80	96	
			45	29.75	103	

APPENDIX III.

DACCA FARM.

*Results of Indrasail paddy—Dacca University Experiment (1939-40).**Office Byde.*

Area of each plot—1/60th acre.

This is the third year of a 5-year course experiment studying the effects of Inorganic Fertilisers in combination with farm-yard manure on the yield of aman paddy. The laying out of the plots and the rates of application of Ammonium Sulphate, Potassium Sulphate, Super-phosphate and farm-yard manure in different plots were the same as those given in previous years. The procedure of transplanting the rice plants were also the same as in previous years. The plants suffered much less damage this year as compared to previous years. The yields of straw and of green and dry weights of paddy are given in the following table:—

Dates of transplanting—17-8-1939 and 18-8-1939.

Date of flowering—25-10-1939.

Date of harvesting—17-12-1939.

*Result of Indrasail paddy—Dacca University Experiment (1939-40).**Office Byde.*

Area of each sub-plot—1/60th acre.

Number of replications—5 (randomised).

Treatment.	Average weight per plot.					
	Straw.		Paddy green.		Paddy dry.	
	lbs.	oz.	lbs.	oz.	lbs.	oz.
1. Potassium Sulphate ..	30	10	28	11	22	6
2. Ammonium Sulphate + Super-phosphate + Potassium Sulphate.	47	3	34	4	27	4
3. Superphosphate + Potassium Sulphate + Cowdung.	40	2	32	15	25	3
4. Ammonium Sulphate ..	24	12	17	12	12	1
5. Ammonium Sulphate + Potassium Sulphate.	31	0	25	3	19	5
6. Ammonium Sulphate + Super-phosphate + Potassium Sulphate + Cowdung.	46	7	34	8	26	10
7. Superphosphate + Potassium Sulphate.	38	0	32	10	25	7
8. Cowdung	42	8	34	11	26	7
9. Superphosphate ..	35	7	30	9	24	12
10. Ammonium Sulphate + Potassium Sulphate + Cowdung.	44	4	32	2	25	10
11. Potassium Sulphate + Cowdung	42	10	37	3	27	1
12. Ammonium Sulphate + Super-phosphate + Cowdung.	37	10	29	14	21	12
13. Ammonium Sulphate + Super-phosphate.	34	4	28	15	22	8
14. Ammonium Sulphate + Cowdung.	40	9	33	13	25	5
15. Superphosphate + Cowdung ..	39	3	32	8	25	7
16. No manure	29	13	28	9	22	15

APPENDIX IV.

DACCA FARM.

*Statement showing area, outturn, cost of cultivation, etc., of main crop,
1939-40.*

Name of crop.	Area in acres.	Total outturn.	Average outturn.	Cost of cultivation per acre including rent of land.		Cost of production per 80 lbs. less value of by-product.	
				Rs.	a. p.	Rs.	a. p.
Aus paddy—		lbs.	lbs.				
Dharial	12.86	10,719	834	32	1 0	2	2 6
Charnak	7.70	4,592	597	33	1 6	3	10 9
P x S 8	3.99	2,027	734	30	0 0	2	8 6
Aman paddy—							
Badkalamkati ..	7.43	4,969	669	31	0 0	2	6 6
Latisali	17.80	25,184	1,409	33	14 6	1	1 6
Bhasamanik ..	23.82	41,197	1,729	36	13 6	1	1 3
Dudsar	3.60	4,666	1,291	31	0 0	1	3 6
Fodder crops—							
Napier grass ..	42.59	1,627,720	38,025	62	6 0	0	2 3
Maize and cowpea ..	18.75	371,018	19,788	29	12 0	0	2 0
Maize	1.33	21,279	15,998	32	0 0	0	2 9
Guinea grass ..	1.90	71,880	37,720	55	0 0	0	1 9

APPENDIX V.

DACCA FARM.

Financial statement of economic area, 1939-40.

Gross area cropped—295·94 acres.

Economic area—14·49 acres.

Debit.		Credit.	
	Rs. a. p.		Rs. a. p.
1. Depreciation of bullocks (10 per cent.).	16 8 0	1. Value of produce ..	1,034 0 0
2. Depreciation of improved implements (10 per cent.).	47 12 0	2. Residual value of manure ..	Nil.
3. Depreciation of country implements (50 per cent.).	2 9 9		
4. Interest on capital (cattle and implements at 5 per cent.).	32 6 3		
5. Supervision charges and pay of Farm Superintendent and one Overseer).	55 14 9		
6. Rent at Rs. 3 per acre ..	43 7 6		
7. Cost of seedlings ..	53 6 6		
8. Manure ..	Nil.		
9. Residual value of manure ..	Nil.		
10. Cost of production ..	556 1 3		
11. Profit ..	225 14 0		
Total ..	<u>1,034 0 0</u>	Total ..	<u>1,034 0 0</u>

APPENDIX VI.

DACCA FARM SEED STORE, 1939-40.

Statement showing supply of seeds, manures and implements.

Seeds—	Name of articles.	Quantity.
Aus paddy seed	.. Charnock, Kataktara, Dharial and P × 8 (farm produce).	24,484 lbs.
Aman paddy seed	.. Indrasail, Latisail, Dudsar and Bhasamanik (farm produce).	7,337·25 „
Boro paddy seed	17,260 „
Guinea grass roots (farm produce).	185 „
Napier grass cuttings (farm produce).	864 „
Paddy seedlings (farm produce)	650 bundles.
English vegetable seedlings (farm produce).	125 Nos.
Banana suckers	93 „
English vegetable seeds (farm grown).	4·90 lbs.
Pea seeds (farm produce)	21 „
Sugarcane cuttings (farm produce).	135,150 Nos.
Manures—		
Lime	205 lbs.
Muriate of potash	43 „
Sulphate of ammonia	3,508 „
Bonemeal	4,813 „
Nicifos	922·25 „
Castor-cake	71 „
Implements—Bengal No. 2 ploughs	5 Nos.

Annual Report of the Kalimpong Demonstration and Experimental Farm for the year 1939-40.

1. **Area and elevation.**—This Farm has a total area of 72.75 acres which is distributed as follows:—

				Acres.
(a) Roads, buildings and waste areas covered by bamboos and wild trees	..	..	..	11.00
(b) Experimental areas	..	..	..	16.20
(c) General Demonstration areas	..	..	..	21.20
(d) Economic areas	..	..	..	1.75
(e) On half-crop system	..	..	..	22.60
Total	..	..	..	72.75

The elevation of the Farm varies as follows:—

				Feet.
Lower boundary	..	..	..	3,200
Farm buildings	..	..	..	3,600
Upper boundary	..	..	..	3,900

2. **Rainfall and character of the season.**—The following table shows the rainfall registered during the year under report:—

Months.	Rainfall in inches.		Number of rainy days.		Remarks.
	Average.	Actual.	Average.	Actual.	
1939.					
April ..	2.60	2.76	7	3	The rainfall on the whole had a favourable effect on the growth of the general crops except flax sown from January to July 1939.
May ..	10.48	7.27	19	16	
June ..	18.40	11.48	21	22	
July ..	26.54	38.44	26	30	
August ..	25.23	25.90	26	21	
September ..	12.69	12.66	17	22	
October ..	6.40	5.41	4	7	
November ..	0.20	..	2	..	
December ..	0.42	..	1	..	
1940.					
January ..	0.15	..	1	..	
February ..	1.56	4.50	6	5	
March ..	0.56	3.66	2	11	
Total ..	105.23	112.17	132	137	

3. **Establishment.**—The Farm was in the charge of Mr. H. R. Edmunds, M.B.E., in addition to his duties as Superintendent of Agriculture, Darjeeling, till 7th March 1940. He went on leave preparatory to retirement with effect from 8th March 1940 and was relieved by Babu Sujyoti Nath Chatterji from the same date. Babus G. M. Thoolungh, Jithir Karthak and P. T. Wangphel worked as clerk, Store-keeper and Fieldman Demonstrator respectively throughout the year.

4. **Operations during the year.**—These may be classified as (A) Experimental and (B) Non-Experimental.

The experimental operations were as follows:—

(a) *Varietal test with maize with a view to find out the superior types and eliminate those that are below mark.*

Variety.				Area in acres.	Total yield of grains.	Yield per acro.
					Mds. srs.	Mds. srs.
White Flat	..	..	..	2.25	28 10	12 22
Yellow Flat	..	..	..	.95	28 10	14 19
Yellow Round	..	..	..	3.25	48 5	14 32
White Round	..	..	..	1.20	20 20	17 3

This year White Round has given the highest outturn. This experiment is being repeated next year.

(b) *Cultural test with maize.*

Terraced *versus* untterraced land.

Results.

Name of maize.				Area (acre).	Total grains.
					Mds. srs.
Terraced area	..	..	Golden Beauty	1.00	25 0
Untterraced area	..	..	Ditto	1.00	22 30

Superiority of terraced cultivation of maize is also proved this year.

(c) *Elevation experiment with paddy (Oryza Sativa):—*

Results.

Height above sea level.	Variety.	Area in acres.	Total yield of grains.	Total yield of straw.
			Mds. srs.	Mds. srs.
3,400—3,500 ..	Jhapaka ..	1.50	40 20	95 0
3,200—3,300 ..	Do. ..	2.50	50 10	95 20

The outturn in lower elevation is not more (i.e., it is less like last year).

(d) *Paddy seed-bed test.*

Rate—9 maunds *versus* 3 maunds of seeds raised per acre.

(i) One-sixth acre seed-bed 1 maund 20 seers seeds.

(ii) One-sixth acre seed-bed 20 seers seeds.

Results.

Variety.				Area in acres.	Total yield of grains. Mds. srs.	Total yield of straw. Mds. srs.
A. Touli	..	..	..	1.25	19 30	52 20
B. Touli	..	..	..	0.50	9 20	30 0

Nine maunds seed rate has not given better results last year as well as in this year.

(e) *Varietal test with Soybeans (Glycine-Hispida).*

Results.

				Area in acres.	Total yield of grains.	Total yield per acre.
Green	..	..	..	1.00	4.27	4 27
White	..	..	..	3.00	12.20	4 7

Only the above 2 varieties were grown, as in the local market other types do not find a ready sale.

(f) *Varietal test with wheat (Triticum Vulgare grown after winter paddy).*

Variety.				Area in acres.	Total yield of grains. Mds. srs.	Total yield of straw. Mds. srs.
Pusa No. 4	..	..	..	1.00	17 10	20 0
Pusa No. 12	..	..	..	1.00	20 5	25 0

The yield has been much better than last year when Pusa No. 12 gave a much lower outturn. The experiment will be repeated.

(g) *Varietal test with potatoes (Solanum Tuberosum).*

Variety.				Area in acres.	Total yield of tubers. Mds. srs.	Total yield of tubers per acre. Mds. srs.
Burma (Sitbo)	..	..	..	0.45	8 8	18 8
White Kidney Shaped	..	..	..	0.45	9 14	20 31
White Round	..	..	..	0.10	1 20	15 0

The result is most unsatisfactory as the crop was badly damaged by field rats and red ants.

(h) *Experiment of Assistant Fibre Expert, Dacca, on Flax to find out the behaviour of an exotic type and its yield.*

Variety.	Area sown.	Particulars of land and time of sowing.	Total outturn of seed.	Total outturn of stalk.
		<i>Terraced area.</i>	Mds. srs. ch.	Mds. srs.
J. W. S.	0·10	November 1938	.. 1 1 4	7 12
"Liral Monarch"	0·10	December 1938	.. 0 14 8	4 28
		January 1939 to July 1939	Crop total failure due to incessant and heavy rainfall and caterpillars.	
	0·10	August 1939	.. 0 5 0	0 20
	0·10	September 1939	.. 0 19 0	1 5
	0·10	October 1939	..	Crop standing.

B. *Non-experimental operations.*—The following miscellaneous crops were grown for fodder and sale and details of their respective areas and yields are noted.

(a) Name of crop and variety.	Area in acres.	Total yield of grains.	Total yield of straw.
		Md. srs.	Md. srs.
Maize (Zeamays)	.. .. 8·30	128 20	..
Marwa (Crow's Foot Millet Eleusine Coracana)	1·20	24 15	30 0
Mashyem (Phaseolus—Calcaratus Sublobatus)	.. .. 1·25	6 10	..
Kalai Dal (Phaseolus Mungo)	.. .. 8·95	45 28	..
Arrow-root (Maranta Arudinacea)	.. .. 0·25	7 10 tubers.	
Sugarcane Mauritius Red	.. .. 0·25	1 14	.. (a)
Saccharum Officinarum Co. 213	.. .. 0·50	33 10	..

(a) Ratoon crop damaged by red ants.

(b) *Thatching grass.*—The area covered by this grass was 1·25 acres. There was an outturn of 178 bundles and all these have been reserved for re-thatching the roof of labourers' huts.

(c) *Napier grass.*—Details of cultivation and utilisation of the produce is given below :—

Area.	Number of cuttings of green grass taken and total weight obtained.	Number of cuttings obtained and distributed for growing.
		Nos.
0·40 acres	.. 120 maunds ..	.. 30,000 cuttings.

(d) Fruit culture—

Area.	Total cost of cultivation.	Total sale-proceeds.
7.25 acres	Rs. 1,021-2-9	Rs. 612-1-9.

Remarks—(Fruits).—It may be noted that during the year chemical manure to the value of Rs. 160 was applied and peach, pear and plum grafts of the value of Rs. 114 was purchased.

(e) Vegetable culture.—A large variety of foreign vegetables were grown for sale as usual and the proper standard of cultivation and crop was maintained. Besides vegetables thousands of seedlings of cabbages, cauliflowers, Knol Khol, etc., were raised and sold locally. Besides seedlings seeds of exotic vegetables were also grown for sale. In the statement below all information has been summarised:—

Serial No.	Name of varieties.	Total amount spent in cultivation.	Total sale-proceeds from vegetables, seedlings and seeds.
	3.00 acres	Rs. 1,006-14-6	Rs. 2,128-4-3
1	Cabbages.		
2	Cauliflowers.		
3	Carrots.		
4	Knol Khol.		
5	Lettuce.		
6	Swedes.		
7	Beetroots.		
8	Onions		
9	Leeks.		
10	Celery.		
11	Parsnips.		
12	Parsley.		
13	Borecole and local varieties.		

Distributed seeds, etc., from the farm:—**A. General Agricultural Crop seeds:—**

Name of seeds.	Quantity.	Number.
	Mds, srs, ch.	
Maize	151 33 8	
Paddy	8 30 0	
Marwa	0 25 0	
Wheat	28 25 0	
Mashyem	5 3 0	
Soybeans	10 13 0	
Buckwheat	0 24 10	
Kalai Dal	1 3 0	
Napier Grass	....	30,000 cuttings.

B. Vegetable seeds and seedlings :—

Cauliflower	..	..	..	2,625	seedlings.
Cabbage	..	..	..	2,763	Do.
Tomato	..	..	..	1,025	Do.
Lettuce	..	..	..	125	Do.
Beetroots	..	..	..	1,425	Do.
Onions	..	..	..	1,000	Do.
Knol Khol	..	..	..	25	Do.
Celery	..	..	..	25	Do.

C. Fruit Trees :—

Pineapple suckers	..	..	..	3,673	suckers.
Tree Tomato	..	..	..	166	seedlings.
Guava	..	..	..	210	Do.
Strawberry	..	..	..	3,620	suckers.
Grenadillas	..	..	..	3	seedlings.
Cardamon plants	..	..	..	500	Do.
Jerusalem Artichoke	..	..	..	200	Do.
Pear Tree	..	..	..	69	Do.
Plum	..	..	..	57	Do.
Papaya	..	..	..	331	Do.
Raspberry	..	..	..	46	suckers.
Apple tree	..	..	..	1	seedling.
Mulberry	..	..	..	41	Do.
Pomegranate	..	..	..	14	Do.
Washington Navel Orange	..	..	..	32	Do.
Sweet Limes	..	..	..	8	Do.
Grape Fruits	..	..	..	14	Do.
Local Orange	..	..	..	360	Do.
Banana	..	..	..	48	hooks.
Limes and Lemons	..	..	..	26	seedlings.

5. Cultivation on economic basis :—

Serial No.	Name of crops grown.	Area in acres.	Yield of grain.	Cost of cultivation.	Value of produce.	Profit or loss.
			Mds. ars.	Rs. a. p.	Rs. a.	
1	Maize ..	1.75	34 10	74 13 9	205 8	See Appendix II.
2	Soybeans ..	..	7 10	34 9 9	36 4	

6. **Cultivation on Barga or half-crop system.**—Detailed information showing the areas, crops grown and Farm's share of produce, etc., are given in the following statement:—

Serial No.	Ares.	Crops grown.	Farm's share of produce.	Approximate price of grains per maund.	Value of produce.		Remarks.
			Mds. srs.	Rs. a.	Rs.	a. p.	
1	9·80	Maize ..	85 0	4 0	340	0 0	The barga cultivators left the Farm shares of Marwa straw in the field for the Farm cattle to graze.
2	12·80	Paddy ..	77 10	3 0	231	12 0	
		Straw ..	140 20	0 13	114	2 6	
3	11·80	Marwa ..	146 5	3 0	438	6 0	

7. **Cattle.**—The strength of cattle maintained during the year for Farm work was 12 heads and their condition was good. When not required for Farm work these animals were let out on hire to Khas Mahal tenants in adjoining blocks and sum of Rs. 126·2 was realised. Three new animals were purchased in March 1940.

8. **Practical training.**—Babu Padambahadur Gurung from Mirik Khas Mahal Block continued his training during the year under report. He has left the Farm with a good record of his work and it is hoped that his training will be properly utilised. Local cultivators are taking interest in the working of this Farm and whenever they arrived they were shown round and were addressed on various Agricultural problems of local importance. These lectures were always supplemented by practical demonstrations.

9. **Manufacture of artificial farm-yard manure.**—1,400 maunds of this manure were prepared from waste vegetable matters and these were applied to the maize area and vegetable garden. This manure has now become indispensable in the cultivation of this Farm.

10. **Exhibits.**—This Farm participated as usual in the 2 well attended and officially patronised melas of this district. The Darjeeling Flower Show and the Bijan Bari Melas. There was no mela at Kalimpong. In these melas lectures were arranged and interested persons were explained the superiority of our exhibits. A representative set of exhibits were sent from here to Rangpur Exhibition.

11. **Visits and inspections.**—The Farm was visited by the following Officers:—Live-Stock Expert, Bengal, Senior Marketing Officer, Bengal, and Assistant Fibre Expert, Bengal, Assistant Registrar, Co-operative Department, Principal, Bengal Textile Institute, and several non-official gentlemen, Mandals and Pradhans during the year under report.

12. **Financial statement.**—See Appendix I.

S. N. CHATTERJI,
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APPENDIX I.

Financial statement of the Kalimpong Demonstration and Experimental Farm, for the year 1939-40.

Debit.		Credit.		Total amount.
Head of Debit.	Amount of each sub-head.	Head of Credit.	Amount to each sub-head.	
	Rs. a. p.		Rs. a. p.	Rs. a. p.
1. Sale-proceeds in hand on 1st April 1939	..	1. Sale-proceeds in hand on 1st April 1940	..	..
2. (A) Value of Farm produce on 1st April 1939	3,050 0 0	2. (A) Value of Farm produce in hand on 1st April 1940	2,200 0 0	2,200 0 0
(B) Value of purchased stores and raw materials in hand on 1st April 1939	1,500 0 0	(B) Value of purchased stores and raw materials on 1st April 1940	2,096 4 0	2,096 4 0
3. Amount of outstanding bills payable by the Farm at the end of the year	..	3. Amount of outstanding bills payable by the Farm on 1st April 1939	..	..
4. Amount of unrealised sale-proceeds due to the Farm at the commencement of the year, i.e., on 1st April 1939	463 12 0	4. Amount of unrealised sale-proceeds due to Farm on 1st April 1940	358 8 6	358 8 6
5. Value of tools and implements in hand on 1st April 1939	1,500 0 0	5. Value of tools and plants and other agricultural implements in hand on 1st April 1940	1,012 12 0	1,012 12 0
6. Value of live-stock and furniture in hand on 1st April 1939	1,350 0 0	6. Value of live-stock and furniture in hand on 1st April 1940	1,439 6 0	1,439 6 0

7. Amount drawn from local treasury—		7. Amount paid into the treasury—	
82 52	(A) Supervision 1 st pay of the Superintendent of Agriculture, and pay and allowance of staff	(A) Credit in cash	7,669 14 3
	(B) Purchase of cattle	(B) Adjusted by B. T. C.	660 2 0
	(C) Feed of cattle	(C) Adjusted by Stock Transfer	592 7 9
	(D) Purchase of seeds, manures and implements	Excess expenditure over receipt, i.e., loss	8,922 8 0
	(E) Wages of labourers		6,958 3 3
	(F) Wages of contingency menials		
	(G) Petty construction and repairs		
	(H) Miscellaneous and other charges		
	(I) Rent, rates and taxes		
	(J) Cost of stores and seeds, etc., adjusted by Book Transfer		
	(K) Cost of stores adjusted by Stock Transfer		
	Deduct—On account of petty construction and repairs	Total	22,987 9 9

NOTES.—Loss due to—

- (A) Heavy land rent paid annually.
 (B) High supervision charge.
 (C) Low price of Farm produce.

APPENDIX II.

Financial statement of the Economic Area (1.75 acres) of the Kalimpong Farm for the year 1939-40.
(Gross cropped area 73.85 acres.)

	Rs. a. p.				Rs. a. p.		
1. Depreciation on cattle (10 per cent.)	0 14 9	1. (a) Value of produce (Maize)	..	..	205 8 0
2. Depreciation on improved implements (10 per cent.)	1 10 9	1. (b) Value (Soybeans)	..	..	36 4 0
3. Depreciation of country implements (50 per cent.)	2 7 0	2. Residual value of manure applied during the year under report remaining unexhausted	..	..	3 6 0
4. Interest on capital (cattle and implements) (5 per cent.)	1 8 6	Loss	..	..	75 3 9
5. Supervision & pay of the Superintendent of Agriculture and pay of 1 Demonstrator	62 0 6				
6. Rent, rates and taxes	94 12 0				
7. Cost of seeds	5 14 6				
8. Cost of manure applied	6 12 0				
9. Residual value of manure applied in 1937-38 and 1938-39	12 4 9				
10. Cultivation and production costs	96 13 0				
11. Marketing	35 4 0				
Total	320 5 9	Total	..	..	320 5 9

Loss is due to heavy land rent and high supervision charges as well as low price of produce.

Annual Report on the Agricultural and Horticultural Demonstration and Agricultural Improvement Works undertaken in the Kalimpong, Siliguri and Darjeeling Sadar Khas Mahals for the year 1939-40.

Introduction.—The work of Agricultural and Horticultural Improvements was first started in 1920-21 under Government order No. 3215L.R., dated the 2nd April 1919, and since then the work has been mainly concentrated to the Khas Mahal Blocks of Pedong, Gitbyong, Nimbong and Yok Printam in the Kalimpong subdivision.

The work for the year under report was sanctioned under Government order No. 5317L.R., dated the 8th May 1939.

2. Charge and tours.—Mr. H. R. Edmunds, M.B.E., Superintendent of Agriculture, Darjeeling, conducted this work from 1st March 1939 to 29th February 1940. Two Sub-Overseers Babu Daniel Juribu and Babu Jitbahadur Subbah (whose services are sanctioned year to year) assisted the Superintendent of Agriculture, Darjeeling.

In the month of March 1940 Mr. Edmunds was in charge up to 7th March 1940 when he was relieved by Mr. S. N. Chatterji.

Tours.

			Days.
Mr. H. R. Edmunds, M.B.E.	...	...	116
Mr. S. N. Chatterji	...	...	6
Babu Daniel Juribu	...	...	291
Babu Jitbahadur Subbah	...	...	294

During these tours practically 70 per cent. of the Khas Mahal holdings were visited in different seasons of the year and intensive propaganda was made among the tenants on the subject of better methods of crop production, selection and preservation of seeds, conservation of farm-yard manure in covered pits, preparation of artificial farm yard manure. Besides all other demonstrations and recommendations were fully explained to these tenants in course of these tours.

In addition to the above tours a large number of cultivators and others interested in agriculture living within a radius of 5 miles of Kalimpong were visited for general propaganda and disseminating new agricultural ideas.

3. Demonstrations.—The following programme was followed:—

(A) Introduction of approved varieties of maize, wheat and other seeds.

(B) Introduction of the cultivation of Co. 213 sugarcane and demonstrations of gur-making by using 3 roller sugarcane-crushing mills and iron pans.

(C) Introduction of fruit culture on scientific lines, also foreign vegetable cultivation as an economic proposition.

(D) Introduction of green manuring, application of artificial manure and lime to increase outturn of crops.

(E) Introduction of the system of covering farm-yard manure in pits and manufacturing of artificial farm-yard manure from all available waste organic matter.

(F) Introduction of improved agricultural implements like maize sheller, winnowers, ploughs, sugarcane-crushing mills, etc.

(G) Introduction of good strains of poultry and dissemination of better knowledge in poultry keeping.

(H) Propaganda by lectures and practical demonstrations.

(A) I. *Demonstration with maize.*—More attention was given for the improvement of this chief staple crop of this district and extensive propaganda was made in all the Khas Mahal Blocks, Tea Estate and Government Cinchona Plantations and Forest Department for the introduction of our high yielding types.

A list of names giving all details of maize demonstrations is furnished in Appendix A.

A list shewing details of distribution of improved maize seeds for demonstration purposes is given in Appendix B.

It may be mentioned here that the demand for our seeds is ever on the increase and the fund placed at the disposal of the Superintendent of Agriculture is hardly sufficient to meet the requirements of the people.

(A) II. *Demonstration with paddy.*—No fresh seed was supplied during the year among Khas Mahal tenants. The cultivators who got their supply in the previous year continued its cultivation.

The crop of paddy gives a sure outturn in years of well distributed rainfall and as there is no question of stagnation of water in the hills, the crop does well in terraced areas. The high price of straw is an additional allurements for the cultivators to go in for the crop.

(A) III. *Demonstration with wheat.*—Pusa wheat 4 and 12 were like previous years included in this demonstration. The area is steadily on the increase and the growers are gradually appreciating the value of the crop in rotation after maize as well as winter paddy. During the year the distribution of wheat seed from the Kalimpong Farm was as follows:—

(a) Pusa No. 4—20 maunds and (b) Pusa No. 12—15 maunds.

(A) IV. The cultivation of mustard though confined mainly among Brahmans and Chetri cultivators is steadily on the increase. The oil is pressed in a very crude way and bullock Ghanies are seldom to be found in the hills at present. The cultivators are always impressed to grow their own mustard and press same locally for their own use.

(B) *Demonstration on sugarcane cultivation and gur-making.*—The people realise its good possibilities and the fact that it can be grown as a ratoon crop in the hills for 7 to 8 years is a strong point in its favour. The cheap chaki gur from the plains sometimes stands in the way of local growers for its economical success. The demonstration of

manufacturing of good crystalline solid gur at the Farm and the loan of 4 sugarcane crushing mills in the Khas Mahal Blocks are, however, giving a good impetus to the sugarcane growers who get a good market for better quality of locally manufactured gur. The details shewing the call on the 4-bullock power sugarcane-crushing mills are embodied in Appendix C.

Adequate funds are necessary to introduce at least 6 more mills and pans in the Khas Mahal Blocks in Kalimpong subdivision.

(C) Introduction of Fruit Culture on Scientific lines and cultivation of foreign vegetables on Commercial lines.

(C) 1. The tenants were always impressed to grow fruit plants to supplement their income. The distribution list *vide* Appendix D, gives an idea of the number of fruit trees of various types distributed by us during the year.

It is found that the fund placed at our disposal is rather inadequate to take up the work of supply of grafts, etc., more extensively in keeping with the demand. It was found that orange, pine-apple, peaches, pears, plums, papayas, bananas, passion flower fruits, and tree tomatoes amongst others grow well. Necessary instructions were given as usual to the growers about precautions to be taken against insect attacks, undertaking root and branch pruning, budding and laying of fruit orchards and care and after treatment of same.

It is gratifying to mention that our advice was freely taken and the number of fruit trees is increasing annually even in the most remote outlying blocks.

(C) 2. *Vegetable culture.*—The cultivation of foreign vegetables is becoming popular every year and the area is steadily on the increase. Want of irrigation facilities and extra expenditure in fencing and competition with vegetables sent from the plains sometimes confront the hill growers; but in spite of these difficulties seeds and seedlings worth Rs. 100 was sold among the Khas Mahal tenants through the two Sub-Overseers.

(D) *Introduction of the system of green manuring.*—The cultivators were instructed in course of tours to bury all green weeds at the time of hoeing their crops with the double object of increasing the fertility of the soil and suppressing the weeds while they are young.

(E) 1. *Introduction of conservation of farm-yard manure in covered pits and the manufacture of artificial farm-yard manure in the open.*—Everywhere the cultivators were advised to put a shed over their manure pits and they are gradually adopting our ideas.

(E) 2. The details of manufacture of artificial manure from available waste organic matters were carefully explained to the Khas Mahal tenants in course of our tours. For want of funds no bonemeal could be distributed this year; but the tenants were advised to put urine and all cattle shed washings in the heaps. The artificial farm-yard heaps will not only tend to secure a sure supply of good organic manure, but this will help also to keep the Bustis neat and tidy.

(F) *Introduction of improved agricultural implements.*—Practical demonstrations with implements like maize shellers, winnowers, crushers, improved ploughs, Planet Junior Hoes and 3 roller sugarcane mills were frequently arranged at the farm and melas to convince the cultivators on the efficacy of these labour saving appliances.

(G) *Improvement of poultry of the district.*—No eggs were distributed for hatching or any poultry for rearing due to want of funds. In course of our tours the tenants were advised how to make better housing arrangements and to guard against contagious diseases.

(H) *Propaganda work.—Lectures and demonstrations.*—Lectures and practical demonstrations formed the most important routine work of Superintendent of Agriculture and the two Sub-Overseers. Much help was received from the Administrative officials, Manager of Tea Estates and also of Government Cinchona Plantations to make our lectures and demonstrations successful.

The subjects dealt with were as follows:—

- (1) Manufacture of gur and arrowroot.
- (2) Proper method of tillage, selection and preservation of seeds.
- (3) Introduction of fodder and horticultural crops.
- (4) Conservation of farm-yard manure in covered pits and preparation of artificial manure, green manuring of crops.
- (5) Remedial and prevention measures against attack of fungus and insect pests.
- (6) Care and comfort of cattle and poultry.

Demonstrations were also arranged in selected centres in the land of Khas Mahal tenants and the increasing number of requests from tenants for undertaking such demonstrations show that our work on these lines are appreciated by them.

1. *Miscellaneous.—Jute Restriction Propaganda.*—No work was organised at Siliguri as was done last year.

(2) *Exhibits.*—During the year the Government Farm participated in 2 melas—Darjeeling Flower Show and Bijanbari Mela where, besides practical demonstrations, a large number of exhibits of cereals, pulses, oil-seeds and other economic seeds as well as vegetables were exhibited. There were very large attendances at these shows and all queries of the interested visitors were attended to.

(3) *Introduction of fodder grass.*—Napier grass introduced by the Department is gaining popularity. During the year 30,000 cuttings were distributed and the demand for cuttings is on the increase. The entire stock of cuttings of Kalimpong Farm have been reserved for outside supply in the next year.

3. *Weather condition.*—The rainfall on the whole had a favourable effect on the growth of the crops in general in the district.

4. *Cattle.*—The health of the cattle was generally good but in Kalimpong subdivision there was a short-lived attack of rinderpest due to which there was a heavy loss.

Staff.—The two Sub-Overseers Babu Daniel Juribu and Babu Jitbahadur Subbah or Demonstrators employed for agricultural and horticultural improvements in the Khas Mahal worked honestly under trying conditions. The appointments held by these 2 officers are still temporary and they are working for the last 20 years on a year-to-year sanction basis only.

The good work done by these 2 officers is brought to the notice of the Director of Agriculture, Bengal, and Deputy Commissioner, Darjeeling, so that their services may be appreciated and the posts made permanent.

Two Demonstrators are badly required for agricultural work in Siliguri subdivision where very good facilities are available. For want of staff it has not been possible to take up any substantial work there.

Acknowledgment.—Thanks are due to the following gentlemen for the kind assistance and interest taken in works of agricultural improvement in the district—Captain R. H. G. Johnston, I.C.S., Deputy Commissioner, Darjeeling, Mr. K. C. Roy, I.C.S., Subdivisional Officer, Kalimpong, the Subdivisional Officers, Kurseong and Siliguri, the Khas Mahal Officers, Siliguri, Darjeeling Sadar and Kalimpong, Managers of Government Cinchona Plantation and a large number of Tea Estate Managers. Several Mondols gave active support in translating our ideas into action and the names of the following are specially mentioned:—(1) Premsing Kumai, (2) Kazi Prem Dorji, (3) Prabhu Sing, (4) Gyalpu Mandol, (5) Joen Mandol and (6) Bilaiti Mandol and Tan Tsering Mandol.

A statement showing the details of the amount allotted for the continuance of the scheme in 1939-40 is enclosed in Appendix E.

S. N. CHATTERJI,
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APPENDIX A.

Name of Centre, adjoining Blocks and growers.	Outturn from Farm maize seeds cultivated on $\frac{1}{2}$ acre plots.	Name of variety.	Outturn from growers own local and mixed maize seeds cultivated on $\frac{1}{2}$ acre plots.
<i>Yok Pringlam Centre.</i>			
A. Pudung Block—	Md. srs.		Md. srs.
1. Jadulall Mondal	3 20	Y. R.	3 0
2. Jairani Limbu	3 3	"	3 0
3. Narbahadur Rai	3 10	"	3 5
4. Hurkabir Rai	3 12	"	3 5
5. Nurbahadur Limbu	3 30	"	3 25
B. Ichay Block—			
1. Chaturbir Gurung	3 38	Y. R.	3 35
2. Hurkabir Gurung	3 0	"	3 0
3. Chitahang Limbu	2 35	"	2 30
4. Rajman Mondal	4 0	"	1 0
5. Hariprasad Rai	3 26	"	2 20
6. Fupdorji Bhutia	3 30	"	2 20
7. Aku Bhutia	4 0	"	3 20
8. Birbahadur	4 0	"	3 35
9. Dojidem	3 18	"	3 5
C. Dalapchand Block—			
1. Rupden Lepcha	3 15	W. R.	3 10
2. Kumarjit	3 30	"	3 25
3. Singbir	3 0	"	2 38
4. Akatsing	3 18	"	3 10
5. Butcher Lepcha	3 0	"	2 35
6. Rinchen Lepcha	3 5	"	3 0
7. Balineryan Pradhan	3 10	"	3 5
8. Baljit Rai	3 25	"	3 20
9. Sette Chetrini	4 0	"	3 30
D. Lolay Block—			
1. Pugut Lepcha	3 25	Y. F.	3 15
2. Lalbir Durji	3 30	"	3 25
3. Chumit Lepchani	3 10	"	3 5
4. Hurkay	3 5	"	3 0
5. Sukhmaya Raini	3 10	"	3 5
6. Nandalal Brahaman	3 2	"	2 30
7. Balbahadur Brahaman	3 0	"	2 38
8. Arimardhan Rai	3 35	"	3 20
9. Manbahadur Chetri	3 25	"	3 15
10. Doulat Singh Rai	3 20	"	3 15
11. Singbir Rai	3 0	"	3 0
12. Baiman Rai	3 5	"	3 0
13. Dharamdhoj Rai	3 20	"	3 10
14. Jitbahadur Rai	3 15	"	3 12
15. Tashi Lepcha	4 0	"	3 15
16. Sirdal Rai	3 5	"	3 0
17. Karnabir Rai	3 25	"	3 15
18. Prabhusingh Mondal	4 10	"	3 35
19. Sangay Tsering Lepcha	3 38	"	3 30

APPENDIX A—contd.

Name of Centre, adjoining blocks and growers.	Outturn from Farm maize seeds cultivated on $\frac{1}{2}$ acre plots.	Name of variety.	Outturn from growers own local and mixed maize seeds cultivated on $\frac{1}{2}$ acre plots.
E. Pala Block—	Md. srs.		Md. srs.
1. Nachyo Lepcha	4 0	Y. R.	3 30
2. Chaturman Rai	3 0	"	2 30
F. Kankibong Block—			
1. Makaranda Grahman	4 20	Y. R.	4 15
2. Ongdi Lepcha	4 10	"	4 0
3. Konchock Lepcha	4 5	"	4 0
4. Pusang Lepcha	4 15	"	4 0
G. Yok Pringtam—			
1. Chatraman Rai	3 30	Y. R.	3 25
2. Sibnarayan Pradhan	3 20	"	3 15
H. Shekbir Block—			
1. Dewamaya Chotrini	3 20	Y. R.	3 15
2. Aganubahadur Rai	3 5	"	3 0
3. Harkabahadur	3 0	"	3 0
4. Puhalsing Kami	3 5	"	3 4
5. Goray Kami	3 10	"	3 8
6. Sibirui	3 5	"	3 0
I. Samalbong Block--			
1. Jamansing Tamang	3 12	Y. R.	3 10
2. Kishnabir Rai	3 15	"	3 12
3. Khadal Lama	3 10	"	3 5
4. Dhanjit Tamang	3 5	"	3 0
5. Singbir	3 0	"	3 0
J. Singzi Block			
1. Portiman Bhujel	3 5	Y. R.	3 0
2. Narbir Rai	3 5	"	3 2
3. Chaturman Rai	3 4	"	3 0
4. Arthabahadur Rai	3 2	"	3 0
5. Rajman Mangar	3 0	"	3 0
<i>Nimbong Centre.</i>			
K. Samthar Block—			
1. Dymanti Brahmani	3 20	Y. R.	3 10
2. Hazi Lepcha	3 18	"	3 16
3. Akalsingh Bhujel	3 16	"	3 12
4. Harkabahadur	3 18	"	3 16
5. Kharakabahadur	3 16	"	3 15
6. Goray Bhujel	3 5	"	3 5
7. Dharmanand Brahman	3 30	"	3 25

APPENDIX A—*contd.*

Name of Centre, adjoining Blocks and growers.	Outturn from Farm maize seeds cultivated on $\frac{1}{4}$ acre plots.	Name of variety.	Outturn from growers own local and mixed maize seeds cultivated on $\frac{1}{4}$ acre plots.
K. Samthar Block—<i>concl'd.</i>	Md. srs.		Md. srs.
8. Bhagirath Brahman	3 28	Y. R.	3 25
9. Rudhiman	3 20	"	3 18
10. Dilman Bhujel	3 16	"	3 14
11. Manbir Durji	3 10	"	3 8
12. Ranikimaya Bhujelni	3 5	"	3 0
13. Dadur Mondal	3 0	"	3 0
14. Ambersingh	3 2	"	3 0
15. Amritay Kami	3 5	"	3 2
16. Nandalall Brahman	3 10	"	3 8
17. Gazabir Bhujel	3 8	"	3 6
18. Balbir	3 5	"	3 0
19. Lalitbahadur Kami	3 3	"	3 0
L. Youngmakam Block—			
1. Guma Lepchani	3 5	Y. F.	3 2
2. Dilram Bhujel	3 10	"	3 5
3. Singbir Bhujel	3 8	"	3 6
4. Migmar Lepcha	3 0	"	3 0
M. Novgaon l'abringtar Block—			
1. Jasbahadur	3 10	Y. F.	3 8
2. Harakasing Limbu	3 6	"	3 5
3. Siriman Limbu	3 4	"	3 2
4. Daulatsing	3 10	"	3 5
5. Hanku	3 6	"	3 4
6. Kirtiman	3 5	"	3 0
7. Narbahadur Limbu	3 6	"	3 4
8. Dhanbir	3 10	"	3 8
N. Nimbong Block—			
1. Kharkabahadur Gurung	3 5	Y. R.	3 2
2. Kishnabir Rai	3 2	"	3 3
3. Kusaldas Sunwar	3 0	"	3 0
4. Jaganath Brahman	3 20	Y. F.	3 18
5. Balbahadur Chetri	3 10	Y. R.	3 5
6. Permanand Lepcha	3 8	"	3 6
7. Manbir Durji	4 0	W. F.	3 20
8. Ongdup Lepcha	3 5	Y. R.	3 0
9. Kharkasing Mangar	4 20	W. F.	3 20
10. Santabir	3 15	"	3 10
11. Dhansing	4 0	"	3 15
12. Jasman Tamang	3 5	Y. R.	3 2
13. Maya Mangarni	3 38	W. F.	3 15
14. Pacho Lepcha	3 3	Y. R.	3 0
15. Mignam Lepcha	3 5	"	3 2

APPENDIX A—*contd.*

Name of Centre, adjoining Blocks and growers.	Outturn from Farm maize seeds cultivated on $\frac{1}{2}$ acre plots.	Name of variety.	Outturn from growers own local and mixed maize seeds cultivated on $\frac{1}{2}$ acre plots.
O. Manzing Block--	Md. srs.		Md. srs.
1. Damai Tamangni	3 16	Y. R.	3 10
2. Jamansingh Chetri	3 12	"	3 8
3. Kaziman Chetri	3 16	"	3 12
4. Bhawansingh	3 5	"	3 0
5. Tularam	3 6	"	3 4
6. Kalay Karki	3 8	"	3 6
7. Birmaya Chetrini	3 6	"	3 4
8. Birbahadur	3 0	"	3 0
9. Aklbahadur	2 38	"	2 30
10. Chandrabahadur	2 30	"	2 28
11. Bishnumaya Chetrini	2 38	"	2 36
12. Lalsingh Tamang	3 36	"	3 30
13. Balbahadur	3 30	"	3 15
<i>Pedong Centre.</i>			
A. Payong Block--			
1. Pemongdi Bhutia	3 20	Y. R.	3 15
2. Bathi Bhutia	3 15	"	3 15
3. Goray Sarki	3 15	"	3 4
4. Dojee Bhutia	3 15	"	3 10
5. Partab Sarki	4 10	"	3 30
6. Pahalay Bhujel	4 15	"	3 38
7. Naphi Butia	3 15	"	3 10
8. Hangu	3 10	"	3 10
B. Sunduk Block--			
1. Sinki Lepcha	4 15	Y. R.	3 5
2. Desmaya Raini	4 10	"	3 10
3. Purnasing Rai	4 15	"	3 15
4. Rajman Rai	4 20	"	3 15
5. Lakmaya Raini	3 15	"	3 15
6. Kasiram Rai	3 10	"	3 8
C. Sakyong Block--			
1. Chongpen Lepcha	3 15	Y. R.	3 10
2. Presmsing Rai	3 10	"	3 10
3. Gudasingh Tamang	3 15	"	3 10
4. Manabahadur Tamang	3 10	"	3 10
5. Jangdhoj Rai	3 15	"	3 10

APPENDIX A—*contd.*

Name of Centre, adjoining Blocks and growers.	Outturn from Farm maize seeds cultivated on $\frac{1}{2}$ acre plots.	Name of variety.	Outturn from growers own local and mixed maize seeds cultivated on $\frac{1}{2}$ acre plots.
D. Pedong Block—	Md. srs.		Md. srs.
1. Tolay Rai	3 10	Y. F.	3 5
2. Perpetay Rai	3 15	"	3 10
3. Dhan Chering Butia	3 15	"	3 15
4. Bawansingh Rai	3 20	"	3 15
5. Baghirath Brahman	3 15	"	3 10
6. Singbir Tamang	3 15	"	3 15
7. Khampawangdi Bhutia	3 10	"	3 10
E. Kashyem Block—			
1. Manbahadur Sunawar	3 15	Y. F.	3 10
2. Bakhang Rai	3 15	"	3 15
3. Phapu Lepcha	3 10	"	3 5
4. Bagbir Tamang	3 20	"	3 15
F. Kagay Block—			
1. Dhanbir Chetri	2 15	Y. F.	2 15
2. Kesarsing Chetri	2 10	"	2 10
3. Padmalall Chetri	2 15	"	2 15
4. Sonampem Bhutiani	2 15	"	2 10
5. Narbir Pradhan	2 15	"	2 10
G. Ladam Block—			
1. Ating Bhutia	3 20	Y. F.	2 15
2. Raiman Rai	3 20	"	3 15
3. Singbir Rai	3 15	"	3 10
4. Bhagtabahadur Rai	3 15	"	3 10
H. Gurubathan Block—			
1. Chring Lepcha	3 15	Y. F.	3 10
2. Chengi Lepcha	2 10	"	3 10
3. Jitbahadur Rai	2 15	"	3 15
4. Jusbahadur Limbu	2 20	"	3 15
5. Chandraman Rai	3 15	"	3 10
6. Karpiman Rai	3 15	"	3 10
7. Goray Tamang	3 15	"	3 10
8. Namgay Lepcha	3 10	"	3 5
I. Phaperkhetty Block—			
1. Dybhupa Rai	3 10	W. R.	3 5
2. Dowalsing Rai	3 15	"	3 10
3. Chewang Bhutia	3 10	"	3 5
4. Purnalal Rai	3 10	"	3 8
5. Rundip Rai	3 15	"	3 10
6. Chandraman Gurung	3 30	"	3 20
7. Lalbir Gurung	3 20	"	3 15
8. Rajman Rai	3 15	"	3 10

APPENDIX A—conold.

Name of Centre, adjoining Blocks and growers.	Outturn from Farm maize seeds cultivated on $\frac{1}{4}$ acre plots.	Name of variety.	Outturn from growers own local and mixed maize seeds cultivated on $\frac{1}{4}$ acre plots.
<i>Gitbyong Centre.</i>			
Git Bubling Block—	Md. srs.		Md. srs.
1. Dojy Lepcha	3 15	W. R.	3 15
2. Dhansing	3 10	"	3 5
3. Thendup Lepcha	3 15	"	3 10
4. Jaidan Rai	3 15	"	3 10
5. Dalbir Chetri	3 20	"	3 10
6. Jasbir Rai	3 15	"	3 10
7. Dhanbir Chetri	3 10	Y. R.	3 5
8. Dhanjai Brahman	3 10	"	3 5
Pagang Block—			
1. Ransing Rai	3 10	Y. R.	3 8
2. Manabhadur Rai	3 10	"	3 8
3. Saransing Rai	3 8	"	3 8
4. Bisnulal Brahman	3 8	"	3 0
Gitbyong Block—			
1. Atibal Thukuri	3 5	W. R.	3 0
2. Jyotiprasad Thakuri	3 10	"	3 5
3. Ratandhoj Rai	3 10	"	3 5
4. Dibbahadur Thakuri	3 10	"	3 8
5. Pasang Lepcha	3 10	"	3 4

APPENDIX B.

Showing statement of Maize Seeds supplied free and realised under report for next year's sowing.

Name of Blocks.				Quantity of seeds.
				Mds. srs.
Pudung	..	..	..	0 25
Ichay	..	..	..	1 5
Dalchand	..	..	..	1 5
Lolay	..	..	..	2 15
Pala ..	..	..	..	0 10
Kankibong	..	..	..	0 20
Yok Primtarn	..	..	..	0 10
Seokbir	..	..	..	0 30
Samalbong	..	..	..	0 25
Sinjie	..	..	..	0 25
Samthar	..	..	..	2 15
Yangmakum	..	..	..	0 20
Nov-gaon Pabringtar	..	..	..	1 0
Nimbong	..	..	..	1 35
Manzing	..	..	..	1 25
Payung	..	..	..	1 0
Sunduk	..	..	..	0 30
Sakyong	..	..	..	0 25
Pedong	..	..	..	0 35
Kashyem	..	..	..	0 30
Kagay	..	..	..	0 30
Ladam	..	..	..	0 20
Gorubathan	..	..	..	1 0
Phaperkheti	..	..	..	1 0
Gitbyong	..	..	..	1 0
Pagang	..	..	..	0 20
Git Bubling	..	..	..	0 25
Total				25 0

APPENDIX C.

Name of Blocks and number of cultivators using the crushing mills and pans.					Number of days using the mill and pan.	Quantity of Gur manufactured.
						Mds. srs.
Kagay Block	..	..	..	5	26	30 20
Payung Block	..	..	..	9	26	29 35
Sindipong Block	..	..	..	5	38	42 15
Pudung Block	..	..	..	7	25	30 5
Ichay Block	..	..	..	8	41	47 25
Bom Block	..	..	..	4	21	27 27
Total					177	208 7

APPENDIX D.

List of Fruit Trees distributed during the year under report.

Varieties of fruit trees.	Number.
1. Papaya seedlings	320
2. Raspberry suckers	40
3. Peach trees	60
4. Plum trees	48
5. Mulberry trees	36
6. Pear trees	60
7. Pomegranate trees	14
8. Navel Orange trees	32
9. Sweet limes trees	8
10. Grape fruit trees	14
11. Sikkim orange trees	360
12. Banana hooks	48
13. Limes lemon trees	26
14. Singapore Queen pineapple suckers	2,000
15. Tree tomato seedlings	160
16. Guava trees	210
Total ..	<u>3,436</u>

APPENDIX E.

Statement showing the details of the amount allotted for the continuance of the scheme in 1939-40.

Particulars of allotment.	Amount allotted.	Particulars of expenditure.	Amount.
	Rs.		Rs. a.
Special pay of the Superintendent of Agriculture, Darjeeling ..	600	Special pay of Mr. H. R. Edmunds at Rs. 50 per month ..	600 0
Compensatory allowance of the Superintendent of Agriculture ..	600	Compensatory allowance of Mr. H. R. Edmunds at Rs. 50 per month ..	600 0
Salary of the two Agricultural Sub-Overseers ..	840	Salary of two agricultural Sub-Overseers at Rs. 35 per month ..	840 0
Salary of one peon ..	156	Salary of one peon at Rs. 13 per month ..	156 0
House rent and other allowance of the peon ..	24	House rent and other allowance of peon at Rs. 2 per month ..	24 0
Fixed travelling allowance of the peon ..	38	Fixed travelling allowance of peon for touring 100 days at 6 annas per day ..	37 8
Contingencies—Miscellaneous purchase and distribution of seeds and plants in the various Khas Mahal Blocks in the district of Darjeeling ..	375*	*Kalimpong subdivision (A) ..	215 10
		West Tista and Relling Estate (B) ..	159 4
Total ..	<u>2,633</u>	Total ..	<u>2,632 6</u>

Annual Report of the Government Tobacco Farm, Rangpur, for the year 1939-40.

Introduction.—The total area of the farm is 72 acres of which 53·68 acres are under cultivation, while the rest of the area is occupied by roads, buildings, drains, tanks, etc.

Rainfall and character of the season.—

Months of the year.		Actual rainfall in inches.	No. of rainy days.	Normal rainfall in inches.
1939.				
April	..	..	..	3·01
May	..	21·53	13	10·66
June	..	22·20	24	18·00
July	..	11·44	21	15·89
August	..	11·93	15	12·80
September	..	13·62	18	14·24
October	..	12·38	8	4·87
November	..	0·80	1	0·12
December	..	..	..	0·05
1940.				
January	..	..	..	0·50
February	..	1·84	3	0·50
March (up to 12th instant)	..	0·70	1	1·25
		<u>96·44</u>	<u>104</u>	<u>81·89</u>

The spread of rainfall was uneven throughout the year, much deviating from the normal. Rains started rather late, causing much delay in kharif sowings, while unusual rains in subsequent months told upon the crops adversely.

During the months of August and September, the weather was favourable for the preparation of tobacco seed-beds, but heavy down-pours in October, combined with strong wind had a most adverse effect upon the tobacco seedlings and its transplantation. On the whole, the season was not a favourable one, specially for tobacco. The average tobacco crop of the district is far below the normal in outturn and quality.

Establishment.—Babu H. Roy Choudhury, B.Ag., was in charge of this farm till 16th of October 1939 and was relieved by Babu N. K. Roy, B.Sc., who continued for the remaining period of the year under report. The other staff consisted of one Overseer, one Tobacco Curer and one clerk.

Operations during the year.—The cultivation operations during the year under review are given below:—

Kharif.—(i) Sunnhemp for green manure was grown in an area of 18·63 acres and was ploughed down during the rains.

(ii) Dharial aus paddy was grown in an area of 8.70 acres and a total yield of 154 maunds 10 seers of grains was obtained. The crop was satisfactory, though the sowing was much delayed due to drought.

(iii) Maize for silage was grown in an area of 9.50 acres and the total yield was 1,648 maunds of fodder which was made into silage.

(iv) Joar for fodder was grown in an area of 4.00 acres. An yield of 566 maunds 25 seers was obtained and fed to the farm cattle. The crop suffered much from incessant downpours just after sowing, causing a poor outturn.

(v) Napier occupied an area of 2.00 acres of which 0.25 acres have been newly planted this year. An yield of 1,320 maunds 3 seers of fodder was obtained of which 482 maunds were made into silage and the rest was fed to the farm cattle.

(vi) Cowpea for grazing was grown in an area of 3.75 acres and was grazed by the farm cattle.

(vii) Rahar was dibbled in an area of 3.00 acres. The crop was satisfactory.

(viii) *Live-Stock Expert's fodder experiment on catch crops*.—Two varieties of joar and one variety of millet were tried this year as catch crops in an area of 0.10 acre each. The millet seemed to be a bit rapid in growth but the other two were better yielders.

(ix) *Second Economic Botanist's cotton trial*.—269 F variety was tried this year in an area of 0.17 acre. The crop had a poor start due to incessant heavy rains just after sowing, but it improved later on.

(x) Pine-apple occupied an area of 0.10 acre. Fresh suckers from Kalimpong has been planted this year to replace the old stock.

Rabi.—(i) Wheat Pusa No. 12 was sown in an area of 3.50 acres. The crop took a very good start but the total absence of rains during its growing period told upon its fructification to some extent. On the whole the crop has been fairly good. It is being harvested.

(ii) Oats for fodder was grown in an area of 1.75 acres and was fed to the cattle.

(iii) Linseed I. P. 124 and Berhampore variety were sown in 3.00 acres. The crop is fair.

(iv) Lentil No. 5 was sown in 0.10 acre as a trial. The crop took a good start but ultimately failed for want of moisture.

(v) Gram Sabour No. 4 was sown in 0.10 acre. The crop was good but infested by caterpillars.

(vi) *Potato*.—Local potato was tried in an area of 0.05 acre which yielded 6 maunds 24 seers of tubers.

(vii) *Groundnut*.—Seeds of local variety were sown in an area of 0.05 acre as a trial. The growth of the crop was satisfactory but the fructification was poor.

(viii) Barseem was tried this year also in an area of 0.05 acre. The crop was almost a failure. It does not seem to suit this soil.

(ix) *Rhea*.—Occupied an area of 0.03 acre only. Altogether 4 cuttings were taken which gave an outturn of 29 seers 12 chattaks of raw fibre.

(x) **Tobacco.**—The following varieties were grown in the pure-line area of one cottah each. Tobacco seeds are raised from this area by bagging individual plants to maintain the purity of the strain:—

(1) Sumatra, (2) Manilla, (3) Pennsylvania, (4) Pennsylvania—New, (5) Connecticut Broad Leaf, (6) Connecticut Broad Leaf—New, (7) Burmese Havana, (8) Pusa Hybrid—Old, (9) New Sumatra, (10) Aracan Cigar Tobacco, (11) Zimmer Spanish, (12) Java, (13) Regrichi, (14) Murichi, (15) White Burley × Thoimompatty, (16) Sonadour × Pusa 142A, (17) Java × Ohio, (18) Hingli × Ohio, (19) T-18, (20) T-23, (21) T-63, (22) Virginia, (23) Warnia, (24) Orinoco, (25) Yellow Pryor, (26) Pusa 142A, (27) Aysaluk, (28) Cavella, (29) Vuelta, (30) Vuelta-de-Abajo, (31) Ohio, (32) Peliu, (33) Gondiu, (34) Bhengi, (35) Naokhol, (36) Patuakhoh, (37) Cooch Behar Bhengi, (38) Sakuni Bhengi, (39) Jati, (40) Hingli, (41) Deli, (42) Matihari, (43) Barapata, (44) Tonga, (45) Maghi and (46) Borneo Sumatra.

Besides the above the following varieties were grown in the production area as follows:—

	Acres.			
Manilla	0.86
Pennsylvania	0.20
Sumatra	2.50
Sumatra (under shade)	0.50
Bhengi	1.53
Matihari	0.47

The crops were fairly satisfactory. Curing is in progress.

Cigarette tobacco.—Five varieties of cigarette tobaccos, namely, Adcock, Pusa 177, Harrison Special, Gold Dollar and Bonanza were grown in 0.33 acre each, of which the two latter varieties have been newly introduced this year only. The growth of these two varieties were not up to the mark as compared with the other three.

Flue curing experiment.—Besides the five varieties of cigarette tobacco, other varieties such as Yellow Pryor, Cavella, Aysaluk, Orinoco and Pusa 142A were also tried. Five charges have been completed. Three more remain to be done. Harrison Special and Pusa 142 cured better than Adcock, and Pusa 177.

Ensilage of maize.—During the year under report, 2,130 maunds of maize and Napier grass were ensilaged for feed of cattle.

Farmyard manure.—About 3,000 maunds of manure were prepared during the year of which 1,632 maunds were applied in crops.

Cultivation on economic basis.—Nil.

Cultivation on borge system.—Nil.

Distribution of seeds.—The following quantity of seeds were distributed during the year under report:—

(i) Tobacco seeds	..	..	794 tolas.
(ii) Wheat	..	..	9 mds.
(iii) Cowpea	..	..	5 mds. 18 srs. 12 ch.
(iv) Dhariai aus paddy	..	..	144 mds. 10 srs.
(v) Maize seeds	..	..	10 mds.

Cattle.—There were 11 pairs of bullocks at the beginning of the year, of which 2 pairs became old and unserviceable. One of the old animals died of debility and old age and the other three were sold off. They were replaced by 2 young new pairs making up the total strength to 11 pairs. The general condition of the bullocks was satisfactory.

Practical training in Agriculture.—There is a free primary school in the farm which was started in 1929 and continued as a necessary institution in imparting general education with a little agricultural bias for the sons of the local cultivators. The students are given preliminary practical training in Agriculture by actually growing seasonal crops themselves in individual small plots allotted to them in the school compound.

Conference and exhibition.—Nil.

Visits and inspection.—During the year under report, the farm was visited by the Director of Agriculture, Bengal, Deputy Director of Agriculture, Northern Circle, Economic Botanist, Bengal, Second Economic Botanist, Bengal, Assistant Fibre Expert, Bengal, Marketing Officer, Bengal and United Provinces, Economic Botanist, Cawnpore, Subdivisional Officer, Sadar, Circle Officer, Sadar, Miss Taylor and Mr. Taylor, I.P. The Agricultural Chemist, Bengal, paid several visits to this farm.

Acknowledgment.—I am glad to note that Babu Guru Pada Ganguli, Farm Clerk, has discharged his duties most efficiently and faithfully. He is a hardworker and takes keen interest in his work.

G. B. PAL,

Agricultural Chemist, Bengal.

Financial statement of the Government Tobacco Farm, Rangpur, for the year 1939-40.

Debit.

Credit.

<i>Heads of debit.</i>	<i>Amount of each sub-head.</i>	<i>Amount of each head.</i>	<i>Heads of credit.</i>	<i>Amount of each sub-head.</i>	<i>Amount of each head.</i>
	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1. Sale-proceeds in hand at the commencement of the year	Nil	..	1. Sale-proceeds in hand at the end of the year	Nil	..
2. (a) Value of last year's farm produce in hand at the commencement of the year ..	2,069 6 0	..	2. (a) Value of farm produce in stock for sale and farm use	2,456 15 3	..
(b) Value of purchased stores and other raw materials of the previous year in stock at the commencement of the year ..	1,128 5 3	3,197 11 3	(b) Value of purchased stores and other raw materials in stock at the end of the year	1,246 4 3	3,703 3 6
3. Amount of outstanding bills payable by the farm at the end of the year ..	Nil	..	3. Amount of outstanding bills payable by the farm at the commencement of the year	Nil	..
4. Amount of unrealised sale-proceeds due to the farm at the commencement of the year	Nil	..	4. Amount of unrealised sale-proceeds due to the farm at the end of the year	Nil	..
5. Value of tools and plants and other agricultural implements at hand at the commencement of the year	2,682 5 6	2,682 5 6	5. Value of tools and plants and other agricultural implements in hand at the end of the year (including live-stock)	2,901 13 6	2,901 13 6
6. Amount drawn from the treasury during the year—			6. Amount paid to the treasury during the year—		
(a) Pay and allowance of the staff ..	3,365 14 0	..	(a) Amount credited into the treasury ..	365 6 0	365 6 0

(b) Feed of cattle	..	398 12 0	..	(b) Value of stores, seeds, etc., supplied to other farms and departments within or outside the province by adjustment	1,882 10 9	1,882 10 9
(c) Purchase of cattle	..	300 0 0	..	..	..	..
(d) Seeds, manures and implements	..	689 12 9	..	..	..	..
(e) Wages of labourers	..	3,749 12 9	..	..	..	..
(f) Petty construction and repairs	..	1,677 14 0	..	..	..	..
(g) Office expenditure and miscellaneous	..	1,000 0 0	..	..	..	..
(h) Allowance, honoraria, house rent and other allowances	..	4 0 0	..	..	..	..
(i) Rent and taxes	..	22 0 0	..	..	..	..
(j) Agricultural demonstration and propaganda	..	281 4 6	11,499 6 0	..	..	..
7. Cost of stores received from other farms within or outside the province	..	97 1 0	97 1 0	..	..	..
Deduct—			17,476 7 9		Total	8,853 1 9
(a) Petty construction and repairs	..	1,677 14 0	..	Excess expenditure over receipt, i.e., loss	4,228 12 0	4,228 12 0
(b) Overhead charges	..	2,716 12 0	4,394 10 0			
Grand Total	..		13,081 13 9			13,081 13 9

Explanation for loss.—Abnormal low price of tobacco and other agricultural products.

N.B.—There being no economic area, the financial statement is given in the old form.

Annual Report of the Rangamati Farm for the year 1939-40.

1. **Area.**—Total area of the Farm is 36·36 acres consisting of 20·98 acres of hill and 15·38 acres of valley lands. The distribution of the lands is shown below:—

<i>Hill area.</i>						Acres.
Area under road and buildings	..	..	..	..	..	2·00
Area under cultivation	..	..	..	..	..	15·98
Steep slopes under pine-apples and not available for general cultivation	..	..	..	..	..	1·00
Area terraced during the year	..	..	..	..	..	0·50
Culturable waste area remaining to be terraced and brought under cultivation	..	..	..	..	..	2·50
						<hr/> 20·98
<i>Valley area.</i>						
Area under cultivation	..	..	..	..	..	13·30
Area under roads, tanks and drains	..	..	..	..	..	2·08
						<hr/> 15·38

Jume experiments.—An area of 2·01 acres in Sapchari hill is under Jume experiments.

2. **Season and rainfall.**—The rainfall figures are given below:—

Months.			Normal fall.	Actual fall.	Number of days.
1939.					
April	..	..	2·85	6·24	5
May	..	..	13·59	12·43	18
June	..	..	23·03	13·21	22
July	..	..	13·50	29·48	25
August	..	..	17·58	22·70	24
September	..	..	20·04	11·45	22
October	..	..	5·83	4·60	6
November	..	..	4·17	0·60	2
December	..	..	..	..	..
1940.					
January	..	..	..	..	..
February	..	..	..	1·75	3
March	..	..	..	6·42	8

The rainfall was not favourably distributed during the first part of the year which hampered the jume operations and so the yield of jume paddy and jume cotton was much affected. The drought from the middle of October affected the cultivation of rabi crops.

3. **Establishment.**—Babu Nihar Kumar Gupta, District Agricultural Officer, held charge of the Farm throughout the year. He was assisted by two Agricultural Demonstrators for Farm work, one for jume experiments at Sapchari and three for demonstration and propaganda.

On the sanction of the post of a clerk a local Mong youth has been appointed with effect from November 1939. This will relieve one of the Farm Agricultural Demonstrators for propaganda and demonstration work.

4. Operation during the year.—

(A) *Experimental cultivation.*

(i) *Research work on Comilla Cotton* was continued under the control of the Second Economic Botanist, Bengal. For this purpose an area of 1.19 acres of good terraces and Rs. 99-14-6 by way of labourers and bullocks were supplied by the Farm.

(ii) *Jume experiments at Sapchari.*—The different experiments of the previous years regarding jume cultivation were also continued this year and the results are given below:—

TYPE—TABLE A.

Experiment No. 1.—Varietal test of Aus paddy in Jume.

Date of sowing—20th May 1939.

There were 6 varieties and 4 replications.

Name of variety.				Average outturn per acre.	Value per acre.
				Mds. srs. ch.	Rs. a. p.
1.	Kataktara	..	..	9 33 12	9 11 0
2.	Dharial	..	..	10 20 15	21 0 9
3.	Molay	..	..	12 5 10	24 4 6
4.	Gelong	..	..	11 35 5	23 13 3
5.	Surjamukhi	..	..	7 9 11	14 7 3
6.	Phulbadam	..	..	11 8 2	22 6 6

2. *Experiment No. 2.—Varietal test of jume aman paddy.*—Jume aman paddy is not transplanted in jume areas but is dibbled or like other jume crops. The varieties are late in ripening and that's why they are called aman paddy. There is no departmental aman paddy which grows under such conditions and the local varieties were, therefore, tried.

There were 3 varieties with 5 replications which gave the following results :—

Name of variety.	Average outturn per acre.			Value per acre.		
	Md.	srs.	ch.	Rs.	a.	p.
Rengui	..	11	6 4	22	5	0
Turki	..	11	23 8	23	2	9
Kamrang	..	12	6 0	24	4	0

Kamrang scored the highest yield and the variety is also liked by the jumias.

3. *Experiment No. 3.*—Test of aus and aman paddies sown mixed with cotton with a view to find out the most profitable and suitable mixture for jume cropping. The following are the average outturns :—

Name of variety.	Average outturn per acre.			Value per acre.		
	Mds.	srs.	ch.	Rs.	a.	p.
Gelong	..	12	7 8	37	8	0
Cotton	..	1	12 8			
Turki	..	5	31 0	21	1	9
Cotton	..	0	38 4			
Kataktara	..	8	38 8	31	0	9
Cotton	..	1	12 8			
Rengui	..	11	25 8	33	12	3
Cotton	..	1	2 0			
Fulbadam	..	11	31 0	40	3	9
Cotton	..	1	26 12			
Cotton	..	2	35 8	29	10	0
Kamrang	..	7	10 13	28	6	6
Cotton	..	1	15 8			
Surjyamukhi	..	5	37 12	24	10	3
Cotton	..	1	11 0			
Melay	..	11	7 0	32	7	6
Cotton	..	1	0 8			
Dharial	..	6	9 0	18	7	3
Cotton	..	0	24 10			

The results of these three experiments in the previous two years are also furnished below for ready reference.

(1937-38.)

Results of aus paddy in Jume lands.

Replications.

Name of variety.	Total.		
	Mds. srs. ch.		
1. Kataktara	..	0	23 0
2. Melay	..	0	28 0
3. Dharial	..	0	34 0
4. Phulbadam	..	0	35 0
5. Surjamukhi	..	0	31 0
6. Gelong	..	0	32 0
Total	..	4	23 0

From the above results the varieties may be arranged as follows in order of their yield capacity in jume:—

	Yield per acre.		
	Mds. srs. ch.		
1. Phulbadam (local)	..	13	12 8
2. Dharial	..	12	30 0
3. Gelong	..	12	0 0
4. Surjamukhi	..	11	25 0
5. Melay	..	10	20 0
6. Kataktara	..	8	20 0.

Dharial ripened about a fortnight earlier than Phulbadam and about a week earlier than Gelong.

Experiment No. 2.—Varietal test of jume aman paddies Rengui, Turki and Kamrang were grown in randomised sub-plots 1/60th acre in area and replicated five times. The result is given below:—

Name of variety.	Outturn.		
	Mds. srs. ch.		
Rengui	..	1	19 8
Turki	..	0	32 0
Kamrang	..	0	38 0

The varieties can be arranged as follows in order of their yielding capacity:—

Name of variety.	Outturn.		
	Mds.	srs.	ch.
1. Rengui	..	17 34	0
2. Kamrang	..	11 16	0
3. Turki	..	9 24	0

Experiment No. 3.—The test of aus and aman paddies sown mixed with cotton with a view to find out the most suitable mixture.

Three varieties of departmental aus paddies, three of local aus paddies and three varieties of local jume aman paddies were grown mixed with cotton (Comilla) in randomised sub-plots 1/60th acre.

The yield of each variety of paddy and cotton per acre together with the money value is given below:—

		Yield per acre.			Value of produce per acre.		
		Mds.	srs.	ch.	Rs.	a.	p.
1.	Gelong	..	10 20	0	29	8	6
	Cotton	..	3 11	4			
2.	Phulbadam	..	9 22	8	28	3	0
	Cotton	..	3 9	13			
3.	Dharial	..	5 25	0	27	2	0
	Cotton	..	4 0	12			
4.	Rengui	..	8 32	8	25	15	3
	Cotton	..	2 39	8			
5.	Kamrang	..	7 27	8	25	15	3
	Cotton	..	3 6	1			
6.	Surjamukhi	..	6 0	0	25	0	3
	Cotton	..	3 20	2			
7.	Melay	..	8 10	0	24	15	6
	Cotton	..	2 37	3			
8.	Kataktara	..	6 0	0	23	2	3
	Cotton	..	3 5	0			
9.	Turni	..	4 35	0	21	9	0
	Cotton	..	3 3	12			
10.	Cotton (alone)	..	4 39	0	24	15	0

This is the first year of this experiment and nothing definite can be concluded now. As regards the yields of the varieties of paddies when sown alone the results of experiment Nos. 1 and 2 may be referred to.

EXPERIMENT No. 1.

Results of test of aus paddy in 1938-39.

Replications.

Variety.				Average outturn per acre.		
				Mds. srs. ch.		
Kataktara	..	..	..	7	31	4
Dharial	..	..	..	11	0	10
Melay	..	..	..	15	3	12
Gelong	..	..	..	16	16	4
Surjamukhi	..	..	..	9	0	0
Phulbadam	..	..	..	15	11	4

EXPERIMENT No. 2.

Vertical test of jume aman paddy.

Replications.

Variety.				Average outturn per acre.		
				Mds. srs. ch.		
Rengui	..	..	..	5	15	1
Turki	..	..	..	5	16	0
Kamrang	..	..	..	5	14	8

EXPERIMENT No. 3.

Different varieties of aus and aman paddy mixed with cotton.

Paddy and cotton.			Average outturn per acre.		
			Mds.	srs.	ch.
Gelong	14	7 0
Cotton	2	18 4
Turki	6	33 0
Cotton	2	24 4
Kataktara	5	3 8
Cotton	1	31 4
Kamrang	7	16 16
Cotton	1	29 0
Cotton	2	24 12
Dharial	9	30 0
Cotton	2	4 12
Surjamukhi	7	3 8
Cotton	2	15 4
Phulbadam	9	15 0
Cotton	2	10 12
Melay	10	3 8
Cotton	2	19 0
Rengui	5	10 0
Cotton	1	32 12

The result of these experiments show that the departmental varieties have got little scope in the jumes under the local method of cultivation. Gelong and Phulbadam appear to be quite good and some selection work should now be undertaken for the improvement of the local strains and seed multiplication. The above experiments may, therefore, be abandoned from this year.

4. *Rotational Juming.*—In my tours to the Naga Hills I have found that the Nagas follow a systematic course of rotation in their jume cultivation. The juming areas are settled to separate families. A second and sometimes third crop is grown in the jume land but often the land is abandoned for rest after two croppings when erosion and needs of the crop have exhausted the fertility of the soil. The abandoned jumes revert to the forest through the invasion of plants from the neighbouring areas of second growth and coppicing of the stools not destroyed by fire. After the land has rested for a number of years, usually from seven to ten, certain fertility is built up and it is again cleared for cultivation.

In the course of cultivation also they follow some processes by which the areas can be afterwards conveniently converted into terraces. The beds are made horizontally by making contour ridging and planting is done along contour strips.

The system followed by the Nagas appears to be a better one than in the Hill Tracts and quite suitable for this district. Good propaganda will, therefore, be made to initiate the different communities of Chittagong Hill Tracts into undertaking this method.

The line of jume experiments will be modified from the next season as we have already arrived at some conclusion with regard to the ones undertaken before.

(B).—*Non-experimental cultivation.*

The cropping of the Farm was done as follows:—

<i>Khariff.</i>			Acres.
1. Aus paddy	.. Hill area	..	3.32
	Valley area	..	1.016
2. Aman paddy	.. Valley area	..	11.21
3. Groundnut	.. Hill area	..	.16
4. Maize and Rahar	Do.	..	.20
5. Joar	.. Do.	..	.3
6. Cowpea	.. Do.	..	2.2
7. Napier grass	.. Do.	..	.55
8. Vegetables	.. ....	..	..

Rabi.

1. Sonamug	..	..	..	2.14
2. Mati Kalai	..	..	..	.7
3. Mustard	..	..	..	2.62
4. Tobacco	..	..	..	.104
5. Winter vegetables	..	..	..	.45
6. Safflower	..	..	..	.1

1. *Aus paddy*.—Total area under different varieties of aus paddy was 4.05. Dharial, Kataktara and Phulbadam were grown and the area together with the yield obtained are furnished below:—

Variety.	Area.	Actual yield.			Yield per acre.		
		Mds. srs. ch.			Mds. srs. ch.		
1. Dharial	.. 1.8	24	20	0	13	24	6
2. Kataktara	.. 1.46	32	10	0	22	3	9
3. Phulbadam	.. .35	4	38	0	14	5	0

All the terraces have not as yet been improved and the average yield per acre is not high in consequence. Due care and attention are being devoted to these poor plots in order to bring them up to the mark of average. It may, however, be said that the yield of paddy obtained in the terraces is much more than in the jumes where it is getting less every year.

Plot No.	Area.	Variety.	Actual yield.			Yield per acre.		
			Mds. srs. ch.			Mds. srs. ch.		
1	..	·08 Dharial	..	1	25 0	20	12	8
2	..	·23 Do.	..	2	35 12	12	23	6
4	..	·12 Do.	..	1	30 0	23	16	5
5	..	·1 Do.	..	1	18 12	14	27	8
6	..	·04 Do.	..	0	24 0	15	0	0
10	..	·1 Do.	..	1	20 8	15	5	0
5	..	·05 Kataktara	..	0	39 0	19	20	0
7	..	·05 Do.	..	0	35 0	17	20	0
8	..	·05 Do.	..	0	39 0	19	20	0
9	..	·05 Do.	..	1	0 0	20	0	0
11	..	·05 Do.	..	1	0 8	10	10	0
14	..	·02 Do.	..	0	29 0	36	10	0

It was further observed that in the terraces the crops mature earlier than in jumes or in any other condition and the seasons appear to be that the heat during the day absorbed by the terrace walls is again liberated during the night. A dry condition of atmosphere is, therefore, created which helps in the early maturity of all crops grown in terraces.

It further reveals from the yield of different varieties of aus paddy obtained in jumes and in terraces that the departmental varieties do well in terraces where tillage is done and fail to grow so satisfactorily in jumes where no tillage is possible. The local varieties also on the contrary do better in jumes and fail to compete with the departmental ones in the terraces.

The demand for aus paddy seeds is on the increase every year and the people have firm belief that farm seeds are pure and have high germination capacity. For growing in the valley areas people want Kataktara seeds and for jumes they want Gelong. It is, therefore, desired to multiply both these varieties at the Farm to keep good quantities of seeds in stock to meet the local demand.

2. *Aman paddy*.—Transplanted aman paddy was grown 8.91 acres in the valley area. The yield of different varieties are furnished below:—

Variety.	Area.	Actual.	Yield
		Mds. srs. ch.	per acre. Mds. srs. ch.
1. Badkalamkati 65	.. 2.21	44 20 0	20 15 0
2. Latisail	.. 2.31	61 15 0	26 26 14
3. D/I (13)	.. .75	13 25 0	18 6 4
4. Dadkani	.. 0.98	20 5 0	20 21 0
5. Tilakchuri	.. 2.66	54 0 0	20 0 0

Latisail has gained popularity in this district and among the other varieties Tilakchuri is also grown by the people in the low-lying areas. Patnai, Dudsar and Balam may be tried here.

3. *Groundnut* was grown in .16 of an acre. As a cover crop it is an excellent one in stopping soil erosion. The yield was 30 seers which comes to an outturn of per acre 4 maund 27 seers 8 chittacks.

4. *Maize* was grown as a single crop and also sown mixed with Rahar. With Rahar it does well as after the harvest of maize Rahar thrives vigorously. Maize being a surface feeder does not interfere with Rahar which is a deep feeder.

After plucking the cobs of maize the plants were made into silage which proved quite good.

Fifty maunds of fodder and 600 number of cobs were obtained from the area .20.

5. *Joar* was grown in an area of .3 of an acre for fodder. The yield was 500 maunds per acre. The fodder was preserved by making silage.

6. *Cowpea* was grown as a cover crop in the waste areas bordering the fencing and in the odd plots. For the purpose of controlling the weeds in a place like this and also to stop soil erosion cowpea is an excellent crop. An outturn of 176 maunds 10 seers of green fodder was obtained from an area of 1.11 acre which comes to 160 maunds 18 seers per acre.

7. *Napier grass* is grown under .55 an acre and the area has been increased this year. Cuttings of Napier grass were planted along the side of the ails constructed in the contour of some flats which have a slow gradient in order to bind the soil. It is hoped that it will serve the dual purpose of binding soil and also at the same time supply fodder for the cattle. The yield per acre was 509 maunds in several cuttings.

8. *Vegetables*.—Among the Khariff vegetables only Olkachu and Mankachu were grown in a .05 area. The kachus of the hill tracts have a very good reputation as these do not tickle the throat. The kachus were quite good. Mankachu was only one season old and sold on an average at a price of annas 6 each.

Rabi.

The rainfall was very unfavourable for rabi crops this year as will appear from the rainfall table. A rainfall on 103.10 inches was received up to the middle of October 1939 and apprehending a long drought from November onward, Sonamug, Mustard, Matikalai, etc., were sown early after cessation of the rains in order to get rid of the harmful effects of drought. Still the crops suffered to a great extent and the yield was also poor as shown below:—

Crop.	Area.	Actual	Yield
		yield.	per acre.
		Mds. srs. ch.	Mds. srs. ch.
1. Sonamung	.. 2.14	3 6 0	1 18 14
2. Matikalai	.. .7	1 24 0	2 11 4

Tobacco.—The soil of the Farm terraces are still too poor for tobacco. The difficulty of irrigation also is another problem. Bhengi appears to be quite suitable for these tracts specially on the river banks which are enriched by a deposit of silt every year in the monsoon. The area under tobacco at the Farm was 100 acres. The crop has been harvested and kept for curing.

Safflower.—The hill women weave their own cloths. To introduce some dye crop Safflower was tried at the Farm. It was quite successful and seeds have been preserved. The petals of the flowers also have been collected and dried to see how the colour develops after keeping for a few months. Safflower will serve the double function as an oil-seed and a dye crop.

Orchard and fruit trees.—The Orange plantation does not appear to be successful at the Farm because of its soil condition.

However, there are good sites in this district in the high hills where orange cultivation has been found to be successful. In those places the soil is highly rich and has got lime in the form of granules. The line of the experiments regarding oranges, therefore, requires to be modified now to introduce orange cultivation in different parts of the hills in this district.

A suitable site should be selected and plants should be propagated locally by budding, discarding the growth of plants from seeds. The stock of Pomelo or some other citrus plants found to be successful in the locality should be used in budding. The seedlings are to be raised from the seeds of well matured fruits after plucking them from the trees instead of using the seeds of shed fruits. In about 2 years from the time of sowing the seeds, when the plants will become 2 feet high they will be ready for budding. The budded plants will be ready for planting out in the permanent orchard in about six months after that.

If this is done then in the course of five years the Farm will be in a position to supply locally-budded grafts to the local hill men from the Farm. A separate scheme is being prepared.

Bananas and pine-apples.—The dull market in the locality for the perishable fruits and vegetables and the difficulties for the transport of agricultural commodity are great obstacles for the improvement and spread of cultivation of these fruits. Queen and Giant kew pine-apples are quite successful for the locality and these are making headway. Pine-apples, if planted in rows horizontal to the slopes, control the erosion of the soil to a great extent. It has further been observed that pine-apples do better in such soil in semi-shade condition. The plants in the north slope which is rather semi-shade are doing excellently well and the size of the fruits is also much bigger than those grown in the other slopes of this hillock.

In order to create a semi-shade condition in the other plots, sowing of *Cajanus* will be done during the next season.

Silage.—Silage was made with maize, Napier grass, Joar and aus paddy straw. 175 maunds of silage were made and the colour and odour were very nice.

Cattle.—There are six pairs of bullocks at this Farm and they kept fit during the year.

Practical training.—Three hill boys have completed a course of one year's practical training at the Farm and two of them have started agricultural work on their own. One Mong boy is still under training. The total number of five youths for training as sanctioned by the Government have not been available.

Exhibition.—No exhibition was held at the Farm but the produce and implements of the Farm were displayed at the Rangamati Agricultural and Industrial Exhibition.

Visits.—The Farm was visited by the Divisional Commissioner, Chittagong, Economic Botanist, Bengal, and Second Economic Botanist, Bengal. The Deputy Commissioner, Chittagong Hill Tracts, frequently visits the Farm and renders all help for experiments and demonstration.

The Farm was also visited by many officials and non-officials who enquired about different information with regard to crops, manures, cultivation and other subjects for the improvement of agriculture.

Acknowledgment.—The Department is grateful to Major G. L. Hyde, Deputy Commissioner, Chittagong Hill Tracts, for his kind help.

NIHAR KUMAR GUPTA,

*District Agricultural Officer, Chittagong
Hill Tracts, Rangamati.*

Financial statement of the Rangamati Farm, 1939-40.

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<i>Debit.</i>		<i>Credit.</i>	
Head of debit.	Amount of each sub-head.	Head of credit.	Amount of each sub-head.
	Rs. a. p.		Rs. a. p.
1. Sale-proceeds at the commencement of the year	Nil	1. Sale-proceeds in hand at the end of the year	Nil
2. (a) Value of last year's Farm produce in stock at the commencement of the year	627 15 6	2. (a) Value of Farm produce in stock on 31st March 1940	888 13 6
(b) Value of purchase stores and other raw materials of previous year's stock at the commencement of the year	276 12 6	(b) Value of purchased stores and other raw materials in stock on 31st March 1940	154 8 0
3. Amount of outstanding bills payable by the Farm at the end of the year	Nil	3. Amount of outstanding bills payable by the Farm at the end of the year	Nil
4. Amount of unrealised sale-proceeds due to the Farm at the commencement of the year	Nil	4. Amount of unrealised sale-proceeds due to the Farm at the end of the year	Nil
5. Value of tools, plants and other agricultural implements in hand at the commencement of the year	2,559 13 6	5. Value of tools, plants and implements, etc., including live-stock and furniture at the end of the year	3,124 6 3
6. Amount drawn from the Treasury during the year :—		6. Amount paid to the Treasury during the year :—	
		(a) Sale-proceeds credited to the treasury	623 15 0

(a) Pay and allowance of establishment (pay and compensatory allowance—1 st of District Agricultural Officer, one Agricultural Demonstrator and Farm Clerk)	1,269 13 0				
(b) Feed of cattle	149 10 0			Nil	623 15 0
(c) Purchase of seeds and implements, etc.	346 8 6				4,791 10 9
(d) Petty construction and repairs ..	399 12 0				3,863 15 3
(e) Wages of labourers	3,200 0 0				
(f) Office expenses and miscellaneous ..	500 0 0				
(g) Reclamation	300 0 0	6,165 11 6			
		9,630 5 0			
		..			
		974 11 0			
		8,655 10 0			
Deduction on account of petty construction					
Reclamation, Jume experiment and contribution to Cotton Research Scheme, etc...					
Grand total				Grand total	8,655 10 0

..

Annual Report of the Propaganda Officer for the year 1939-40.

Charge.—I held the charge of the office of the Propaganda Officer for the period from 1st April 1939 to 16th April 1939 when Babu Sujyoti Nath Chatterjee L.A.G., took charge from me. I took charge of the office from him again on the 1st September 1939 and held the charge till the end of the year. In addition to my duties as the Propaganda Officer, I carried on those of the Special Officer, Jute Restriction Scheme, Bengal. Sujyoti Babu was stationed at Dacca but during the period of my tenure of office my headquarters was Calcutta so that both the duties may be carried on efficiently.

Tours.—I spent 22 days on tour only for the departmental propaganda work. But during my tours in connection with my duties as the Special Officer, Jute Restriction Scheme, I also carried on the propaganda of the Department. Babu Sujyoti Nath Chatterjee spent 12 days on tour.

Principal items of work.—A. *Publication of "Krishi Katha."*—"Krishi Katha" is a bi-monthly bulletin of the Department in simple and popular Bengali. It is distributed free to the officials and non-officials interested in the work of the department. Six issues were published during the year under report of which I was responsible for four and Sujyoti Babu for two.

B. *Preparation of propaganda materials.*—(a) *Leaflets.*—The following leaflets were either prepared and revised during the year under report:—

- (1) Revision of the article "Flax and possibilities of its products in Bengal as a source of fibre."
- (2) Raising seedlings of English vegetables in the plains of Bengal.
- (3) Cold weather vegetables in Union Board demonstration centres.
- (4) Revision of the leaflet No. 5 of 1936 on gram and leaflet No. 3 of 1933 on the cultivation of groundnut.
- (5) Revision of leaflet No. 11 of 1936 on jute cultivation.
- (6) Revision of a note on "Dairy School at the Central Farm, Dacca".
- (7) Revision and translation of a note on "Organisation of pure paddy seed supply".

(b) *Posters and models.*—No funds were available from the Department during the year under report to prepare any posters, models, etc. But from the funds placed at my disposal as the Special Officer, Jute Restriction Scheme, to carry on propaganda for the cultivation of suitable food and economic crops and for the propaganda for subsidiary occupations the following posters and models were

prepared. The posters were distributed largely. The models were exhibited at various exhibitions—

Posters.

(1) Milk posters	..	..	8
(2) Cattle posters	..	..	2
(3) Designs	..	..	3

Models.

(1) Clay models	..	..	4	(1 cow, 1 bull, 1 calf, 1 cow and calf).
(2) Plywood full sized models	..	..	3	} (bull, cow and cock 12).
(3) Plywood models	..	..	9	

(c) *Exhibitions.*—Either posters or models or both were sent to the following exhibitions and they were highly appreciated everywhere. I attended the exhibition held at Sarenga in the district of Bankura :—

- (1) A conference of the Live-stock Officers at Dacca.
- (2) Exhibition at Government Industrial Museum, Calcutta.
- (3) Exhibition at National Industrial Museum, Lalbagh, Dacca.
- (4) Aboriginal Welfare Exhibition at Sarenga (Bankura).
- (5) Agricultural Exhibition at Memari (Burdwan).
- (6) Agricultural and Industrial Exhibition at Sherpur, Bogra.
- (7) Agricultural and Industrial Exhibition at Rangpur.
- (8) Nimtita Exhibition, district Murshidabad.
- (9) Suri Agricultural and Industrial Exhibition (Birbhum).
- (10) Agricultural and Industrial Exhibition at Diamond Harbour.
- (11) Jangipore Thana Exhibition (Hooghly).
- (12) Food Products Exhibition at Commercial Museum, Calcutta.
- (13) Agricultural Exhibition at Mymensingh.
- (14) Agricultural Exhibition at Netrokona.
- (15) Agricultural Exhibition at Suri (Birbhum).
- (16) Agricultural Exhibition at Sriniketan (Birbhum).
- (17) Agricultural Exhibition at Bankura.
- (18) Agricultural Exhibition at Arambagh (Hooghly).
- (19) Bogra Agricultural and Industrial Exhibition.
- (20) Agricultural Exhibition at Haluaghat (Mymensingh).
- (21) Agricultural Exhibition at Manmathpur (Dinajpur).
- (22) Agricultural Exhibition at Tollygunge.

D. *Lectures.*—I delivered two lectures at the Co-operative Training Institute at Dum Dum, exhibited the film “Bhuler Phasal” and displayed posters, models also.

E. Exhibition of film.—The film “Bhuler Phasal” dealing with the activities of the Department was exhibited at the following places during the year under report. The film has been appreciated everywhere. And the Director of Public Information received requests from several districts for its exhibition. He has therefore prepared a number of copies of the film at the cost of his Department for their display by the National Welfare Units:—

- (1) Exhibition of the film at Rajshahi.
- (2) Exhibition of the film at Dum Dum Co-operative Training Institute.
- (3) Exhibition of the film at Calcutta University Institute.
- (4) Exhibition of the film at Comilla.
- (5) Exhibition of the film at Dacca (Mukul Theatre, Tajmahal and Britannia).
- (6) Exhibition of the film at Curzon Hall, Dacca (in connection with the Panchayati Conference).
- (7) Exhibition of the film at Calcutta Corporation Commercial Museum.
- (8) Exhibition of the film at Berhampore (Bengal).
- (9) Exhibition of the film at Rajshahi.
- (10) Exhibition of the film at Rangpur.
- (11) Exhibition of the film at Mymensingh.
- (12) Exhibition of the film at Serampore.
- (13) Exhibition of the film at Howrah-Andul, Amta.

Departmental Operator—Projector generating plant, cine-camera, etc.—Babu Amalananda Kundu was appointed operator on the 15th November 1939. He was given a training by Messrs. Kodaks in the handling of a cine-camera.

A 16 m.m. projector with a microphone and loudspeaker and also a generating plant were purchased during the year.

The operator spent 34 days on tour in connection with the shooting of films, showing departmental activities in various places. In addition shootings have been taken of the Live-Stock Expert's and Agricultural Chemist's Sections at the Dacca Farm. Altogether 2,300 feet of films have been used for the above two sections.

D. N. MITRA,
Propaganda Officer,
Department of Agriculture, Bengal.

Glossary.

Afghani ..	.. A type of winter rice " <i>Oryza sativa</i> " harvested in November.
Anna ..	.. Indian coin, 1-16th of a rupee or 1 and 1-8th pence.
Aman ..	.. The winter paddy crop.
Arhar or rahar ..	.. The pigeon pea " <i>Cajanus indicus</i> ," a pulse crop.
Aus ..	.. The autumn paddy crop.
Ails ..	.. Turfed boundaries between fields.
Bhutta ..	.. Maize " <i>Zea Mays</i> ;" grown both for grain and as a fodder crop.
Bhut ..	.. Gram " <i>Cicer arietinum</i> ;" a pulse crop.
Beel or bhil ..	.. Natural depressions, generally old beds of silted up rivers which serve as reservoirs of flood water during the rains.
Bigha ..	.. Land measures; size varies but is, generally speaking, $\frac{1}{3}$ rd of an acre in Bengal.
Boro ..	.. A paddy crop grown in the cold weather or rabi season.
Bogi jute ..	.. Local name in eastern districts for " <i>Corchorus Olitorius</i> ," a species of jute which will not stand water-logging.
Buri ..	.. A variety of cotton " <i>Gossypium</i> sp."
Barela ..	.. "<i>Sida rhombifolia</i> ;" a fibre plant.
Bydes ..	.. Low lands in Madhupur jungle due to erosion.
Borbati ..	.. Cowpea " <i>Vigna Catjang</i> ;" a leguminous fodder and green manure crop.
Cheuna ..	.. Gram " <i>Cicer arietinum</i> ;" a pulse crop.
Chata Kambu ..	.. Paharia name for mulberry " <i>Morus</i> Spp."
Colu ..	.. "<i>Imperata</i> sp.," a fodder grass.
Chittak ..	.. Weight measure; 1-16th of a seer or 2 and 2-35th oz. Land measure; 1-16th of a cottah or roughly 5 square yards.
Cholorosis ..	.. Whitening of leaves of plants—actual cause not identified.
Court of Wards' Estates ..	Private or zamindari estates under the management of the Board of Revenue.
Dharwar ..	.. A variety of cotton " <i>Gossypium hirsutum</i> ."
Dhaincha ..	.. "<i>Sesbania aculeata</i> ;" a leguminous plant grown for fibre and as a green manure.
Deshi ..	.. Local or indigenous.
Daisee ..	.. Trade name for crops of " <i>Corchorus Olitorius</i> " grown in Central Bengal.
Dhan ..	.. Paddy " <i>Oryza sativa</i> ."
Date gur ..	.. Crude brown sugar obtained by boiling down the juice procured by tapping the date-palm " <i>Poenix-sylvestris</i> ."
Gur ..	.. Crude brown sugar still containing molasses.
Gangajali ..	.. A variety of wheat " <i>Triticum sativum</i> ."

Gram	..	..	The Egyptian pea "Cicer Arietinum."
Hat	..	..	Local market.
Jute	..	..	A fibre plant "Corchorus Spp." Two species grown in Bengal "Corchorus capsularis" which is not affected by water-logging and "Corchorus Olitorius" which only suits high land.

*Varieties.**Departmental races.*

C.C.	..	C.O.	..	C.C.	..	C.O.
Burra pat	..	Dacca Deo	..	K.B.	..	C.G.
Fundak	..	Hooghly Desi	..	D. 154	..	R. 26
Kakya Bombai	..	..	..	D. 89		
Simulkandi	..	..	..	D. 27		
				R. 85.		

Japanese Millet	..	..	"Pennisetum typhoideum," a fodder crop.
Juar	..	..	Sorghum "Andropogon Sorghum;" a millet grown both for fodder and grain.
Kala Dagi	..	..	Black sopt disease of jute due to "Rhizoc tonia Sp."
Kalai	..	..	"Phaseolus Mungo," a pulse crop.
Kasch	..	..	A poisonous substance found in the coastal area of Chittagong due to which a large part of the coastal area is going out of cultivation. This has been found to be associated with the existence of vegetable matter at various stages of decomposition in various depths.
Kharif	..	..	The rainy season.
Khas Mahal estates	..	..	Temporarily settled proprietary estates, which are under the direct management of Government, as well as estates owned by Government.
Kottah	..	..	Land measure ; 1-20th of a bigha or roughly 81 square yards.
Khesari	..	..	"Lathyrus sativus," a pulse crop grown both for grain and fodder.
Kapas	..	..	Raw cotton before extracting the seed.
Ketli	..	..	"Agave Spp.," Fibre plants.
Masuri	..	..	Lentil "Ervum lns;" a pulse crop grown for grain.
Matar	..	..	Field pea "pisum sativum;" a pulse grown both for grain and as a fodder crop.
Mung	..	..	"Phaseolus radiatus;" a pulse grown for grain.
Marua	..	..	"Eleusine Coracana;" a small millet grown for grain.
Mela	..	..	A fair.
Maund	..	..	A measure of weight ; 40 seers or 82 and 2-7th lbs.
Mashyem Kalai	..	..	"Phaseolus calcaratus;" a pulse grown for grain, as a fodder crop and as a green manure.
Matikalai	..	..	"Phaseolus Mungo;" a pulse crop grown for grain.
Natal grass	..	..	"Tricholena rosea;" a fodder grass.
Napier grass	..	..	"Pennisetum purpureum," a fodder grass.

Phapar	..	.. Buckwheat " <i>Fagopyrum esculentum</i> ;" grown as a grain crop in the Hills.
Pat	..	.. Jute " <i>Corchorus</i> Spp."
Pretoria grass	..	.. "<i>Panicum</i> Sp." a fodder grass.
Paddy	..	.. Rice " <i>Oryza sativa</i> ;" the main cereal crop of Bengal.

Varieties.

Badshabbhog	..	Elai	..	Panisail.
Bhadkalamati	..	Gangajali	..	Puki.
Bhutmuri	..	Gazia	..	Sonamail.
Chapalo	..	Indrasail	..	Surjamukhi.
Charnak	..	Jhingasail	..	Ramtulsi.
Dudkhani	..	Kataktara	..	Ramtomarsi.
Dhansi	..	Kataribhog	..	Tilakachari.
Dhepi	..	Mansira	..	Timurary.
Digha	..	Marichabeti	..	Touli.
Dudsar	..	Nagra.		

Pie	..	.. Indian coin 1-12th of anna.
Pice	..	.. Indian coin 3 pies, roughly a farthing.
Rahar	..	.. The Pigeon pea " <i>Cajanus indicus</i> ;" a pulse grown for gram, the same as Arhar.
Rupee	..	.. Standard Indian Silver coin valued 1s. 6d.
Rai	..	.. Mustard " <i>Brassica juncea</i> ," an oilseed.
Reri	..	.. Castor oil plant " <i>Ricinus communis</i> ;" oil-seed.
Reana	..	.. "<i>Reana luxurians</i> ;" a fodder crop.
Rhee	..	} China grass " <i>Boehmerianivea</i> ;" a fibre plant.
Ramie	..	
Rabi	..	.. The cold weather season.
Soy	..	.. Soya bean " <i>Glycine Soa</i> ;" a pulse rich in oil.
Sunn or Sannai	..	.. Sunn or Indian hemp " <i>Crotalaria juncea</i> ;" a fibre plant.
Seer	..	.. A measure of weight ; 2 and 2-35th lbs.
Sugarcane	..	.. "<i>Saccharum officinarum</i> ."

*Varieties.**Departmental races.*

Gandari	..	.. Co. 213.
Khagri	..	.. Yellow Tanna.
Kheri.		
Shamshara.		
Vendamukhi.		

Sudan grass	..	..	"Nolens Sudalensis," a fodder grass.
Tak	..	..	High lands in Madhupur jungle tract.
Tori	..	..	Rape "Brassica Napus var, dichotoma;" an oil-seed.
Tur or Tunt	..	..	Mulberry "Morus Spp."
Til	..	..	Gingelly "Seasamum indicum;" an oil-seed.
Tisi	..	..	Linseed "Linum usitatissimum;" an oil-seed.
Tola	..	..	A measure of weight; 2.5th oz., roughly.
Tamac	..	..	Tobacco "Nicotiana Spp." Two species grown in Bengal "Nicotiana Tabacum" and "Nicotiana rustica."

Varieties.

N. Tabacum	..	..	N. Rustica.
Bhengi	..	..	Bilaita.
Havana	..	..	Matihari.
Naokhol.			
Orinoco.			
Ohio.			
Pennsylvanian.			
Sumatra.			
Thotnompatty.			
White Barley.			
Manilla.			
Tosha	Trade name for "Corchorus Olitorius" jute from Pabna and Rajshahi districts.
Ufra	A disease of rice caused by an eel worm "Tylenchus sp."

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